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Cancer of the rectum.

A TREATISE ON
DISEASES
OF THE
RECTUM AND ANUS

EDITED BY

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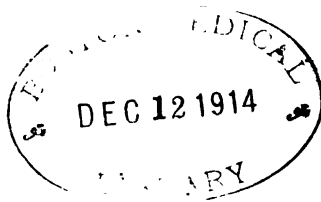


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TO
DR. JOSEPH M. MATHEWS
THE PIONEER AND NESTOR OF AMERICAN PROCTOLOGY
THIS VOLUME IS
AFFECTIONATELY DEDICATED

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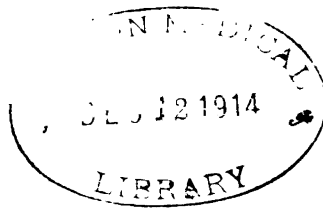
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CHAPTER I.

Anatomy and Physiology.

ANATOMY.

FROM the standpoint of anatomy as well as physiology and pathology, the rectum is a portion of the colon, modified and specialized it is true, but differing chiefly in what may be termed the accidents of location and relations. For this reason and because of the important fact that the successful management of certain rectal diseases requires intelligent treatment of the entire large bowel, in many instances involving serious surgical operations, it seems desirable here to include a brief review of the anatomy of the colon and sigmoid flexure.

The large intestine in the adult averages five to six feet in length. Beginning in the right iliac fossa, it pursues an irregular but definite course through the abdominal and pelvic cavities, terminating in the anal canal, through which it reaches the surface of the body. To facilitate description it is divided into three portions: the *colon*, the *sigmoid flexure* or *pelvic colon*, and the *rectum*.

THE COLON.

The colon begins in a dilated blind pouch (cecum, caput coli), which lies on the psoas muscle near the pelvic brim in the right iliac fossa. From this point it passes almost vertically upward to the under surface of the liver, where it turns forward and to the left, forming the hepatic flexure. Thence it runs more or less transversely across the upper portion of the abdominal cavity under cover of the great omentum, which is attached to it, to reach the lower end of the spleen. Here it again changes its direction, forming the splenic flexure, and passes downward upon the left side of the abdominal cavity to terminate in the sigmoid, or pelvic, colon opposite the left psoas muscle, a point corresponding quite accurately with that of its origin.

The several portions of the colon are distinguished by separate names:—

The Cecum is that portion which lies below the level of the ileocecal opening. From its inner and posterior aspect the appendix is given off. This portion has acquired special interest for the rectal surgeon

of late by reason of the modern operations, cecostomy and appendicostomy, which are performed upon it.

The Ascending Colon is that portion between the cecum and the hepatic flexure. It is approximately eight inches in length, lies close to the right lateral wall of the abdomen, and is more capacious in size than the succeeding portions.

The Transverse Colon is that portion which lies between the hepatic and splenic flexures, and is about twenty inches in length. It is anchored rather closely at either end, but the intervening portion is provided with a long mesentery (transverse mesocolon), which permits it to hang down in front of the small intestines, oftentimes to the level of the umbilicus or lower. The great omentum is attached to its anterior surface.

The Descending Colon is that portion extending from the splenic flexure to the left psoas muscle, where the sigmoid colon begins. It is from eight to ten inches in length. It is deeply placed in the abdominal cavity, lying close to the posterior abdominal wall, with coils of small intestine covering it.

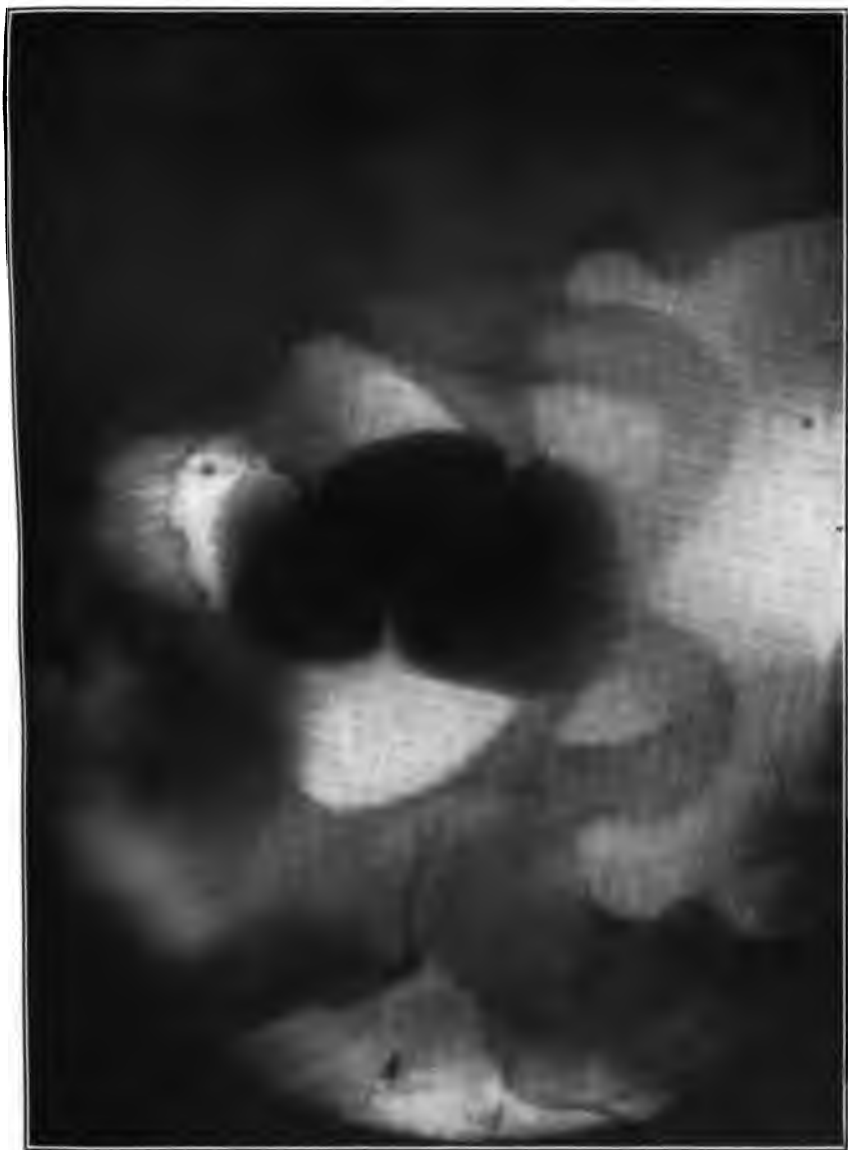
In the great majority of cases neither the ascending nor the descending colon is provided with a mesentery. On this account these portions are more easily located in the operation of colostomy than would otherwise be the case. Identification of the colon for surgical purposes is rendered easy by the presence of the longitudinal bands (*teniæ coli*) and the sacculated appearance they give rise to, and also by the presence of the appendices epiploicæ attached to the serous coat, which are distinctive features when well developed.

The structure of the colon is for all practical purposes identical with that of the sigmoid flexure, and will be referred to under the next heading, as will also the blood and nerve supplies.

THE SIGMOID FLEXURE (PELVIC COLON, SIGMOID COLON).

Judging from the published descriptions, the sigmoid flexure is a loop of the large intestine interposed between the descending colon and the rectum, rather indeterminate as to origin and termination, and consequently more or less variable as to length (Plate I). There is no reason for vagueness of conception or indefiniteness of expression on the subject. Anatomic points are not always so clearly indicated by nature. It was stated above that the descending colon, as a rule, has no mesentery. The succeeding sixteen to eighteen inches are provided with a mesentery, appearing in the form of a long loop (the sigmoid flexure), which is the most freely movable segment of the large bowel. The attachment

PLATE I.



Rectum and sigmoid distended with bismuth-buttermilk mixture; patient in dorsal position.

of this mesentery begins above, opposite the left psoas muscle, and ends below at a fairly constant point in front of the third piece of the sacrum.

The sigmoid flexure may therefore be defined as that portion of the large intestine immediately succeeding the descending colon, *which is*

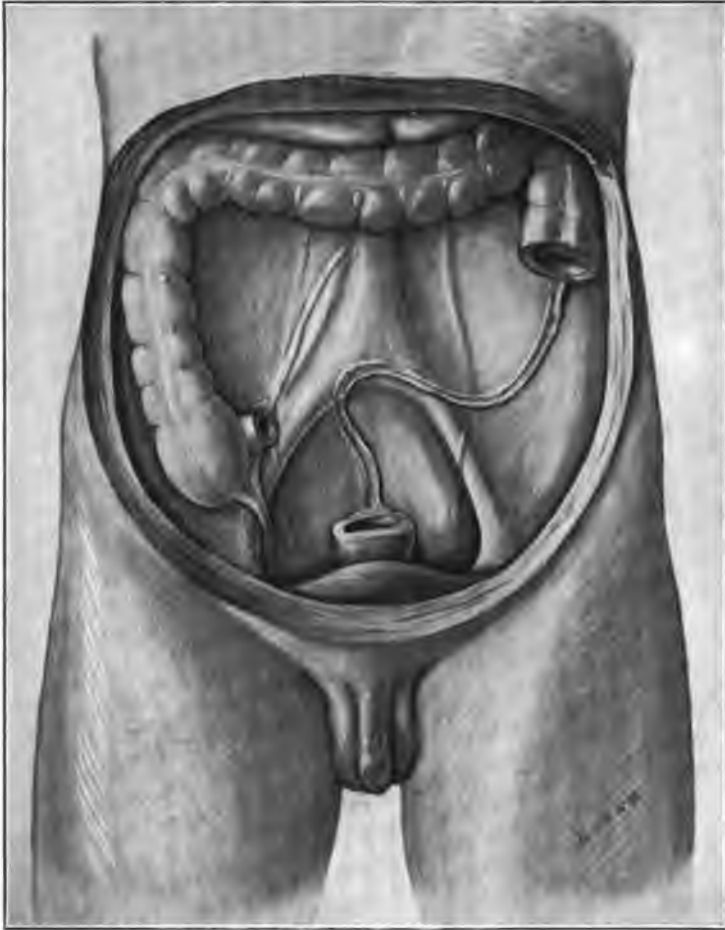


Fig. 1.—Attachment mesosigmoid.

provided with a mesentery. As above indicated, the length of this portion averages from sixteen to eighteen inches, and it presents itself as a variously shaped coil or loop lying normally within the cavity of the true pelvis. The line of attachment of the mesosigmoid is quite irregular and varies considerably in different subjects. It is sufficiently accurate to say that, beginning at its point of origin, it quickly dips over the brim

of the pelvis, crosses the promontory of the sacrum, ascending slightly to a point about one inch to the right of the median line, where it turns downward and inward to reach the midline at the third piece of the sacrum (Fig. 1). Generally speaking, the curve of the bowel loop corresponds to the attachment of its mesentery, though this is subject to many variations dependent upon its length and the length of its mesentery, the emptiness or distention of the other pelvic viscera, as well as its own state in this regard, and possibly also upon the presence or absence of active peristalsis.

Inasmuch as the normal position of the sigmoid and the attachment of its mesentery lie within the cavity of the pelvis, the term *pelvic colon* applied to it by recent writers is both accurate and appropriate.

Structure of Colon and Sigmoid.

The large bowel is composed of four coats or tunics: the serous, the muscular, the submucous, and the mucous.

The Serous Coat (or serosa) is derived from the peritoneum and completely invests the cecum, the transverse colon, and the sigmoid flexure, forming their mesenteries and providing these divisions with a considerable though variable degree of mobility. The ascending and descending colon, as a rule, are not covered by peritoneum on their posterior aspects, these portions in consequence being more or less firmly attached along this surface to the structures with which they lie in contact. The appendices epiploicæ are little processes of peritoneum, usually containing fat, which project from this coat throughout the entire length of the colon and sigmoid.

The Muscular Coat is composed of the two layers of unstriped muscle-fibers common to the entire alimentary tract. The external, longitudinal layer presents itself in the form of three equidistant bands about one-third inch wide, known as the *teniæ coli*, which seem to originate at the base of the vermiform appendix. As the lower part of the sigmoid flexure is approached this arrangement becomes modified by the union of the anterior and external *teniæ* into a single broad band, which occupies the anterior surface of the gut, the posterior *teniæ* at the same time spreading out, so that in this situation two broad, thinner bands replace the three narrow ones of the higher portions. At the juncture of the sigmoid with the rectum the investment of the viscus by this layer becomes complete. The longitudinal bands are considerably shorter than the intestine to which they belong, and in consequence give rise to its characteristic sacculated condition.

The internal, circular layer of the muscular tunic is practically uniform in thickness and arrangement throughout the colon and sigmoid.

The Submucosa is a layer of areolar connective tissue in which the nerves, blood-vessels, and lymphatics ramify, and in which the solitary follicles are imbedded.

The Mucosa differs from that of the small intestine chiefly in containing no villi. Its surface is smooth and presents the orifices of numerous Lieberkuhn glands. Solitary glands are also found in it throughout its length.

The blood-supply of the colon and sigmoid is derived from the superior and inferior mesenteric arteries. Veins corresponding to the arteries collect the blood and return it through the portal vein.



Fig. 2.—Paraffin cast showing curves of rectum.

The nerve-supply is from the sympathetic system through the superior mesenteric and aortic plexuses. The nerve-fibers, of the non-medullated variety, are distributed in the form of two gangliated plexuses, one (Auerbach's) ramifying in the muscular coat between the longitudinal and circular layers, the other (Meissner's) in the submucosa.

THE RECTUM.

The name *rectum*, from the Latin word meaning *straight*, is a palpable misnomer as applied to the terminal portion of the intestinal tract. In quadrupeds, where the organ occupies practically a horizontal position, it is comparatively straight; hence, doubtless, the use of the term in this connection. In the human subject it is not even approximately

straight except when viewed with reference to the mesial plane of the body.

The **rectum** measures from six to eight inches in length. It begins above where the sigmoid flexure terminates, opposite the third sacral vertebra, and ends below at the anus. It is naturally divided into two portions: an upper, expanded, and freely movable portion (the movable rectum, or rectum proper), and a lower, contracted, and fixed portion (the anal canal).

The **movable rectum** embraces that portion of the organ which lies within the cavity of the true pelvis. It is from five to six inches in length, beginning above at the point already indicated and terminating below at the upper surface of the levator ani muscles, or pelvic floor, opposite the lower border of the prostate gland (in the male), at a point about one and one-half inches in front of and slightly below the level of the tip of the coccyx (in both sexes). It presents a double or compound anteroposterior curve. Above it lies closely in apposition to the anterior surfaces of the sacrum and coccyx, the convexity of the first or upper curve being directed backward. At the lower margin of the prostate gland it bends rather abruptly downward, forming the second or lower curve, the convexity of which looks forward and upward (Fig. 2).

The *size* of the movable rectum varies considerably in different regions, and is dependent in all regions upon its condition of emptiness or distention. It is smallest above where it joins the pelvic colon and below where it merges into the anal canal. The greater part of the intervening portion presents a marked enlargement known as the *ampulla* (or pouch) of the rectum, the greatest diameter of which is opposite the prostate gland. According to many measurements of the excised rectum made by Quenu and Hartmann, the average circumference of the ampulla is in its upper part eight to ten centimeters (3.2 to 4 inches) and in its lower part thirteen to sixteen centimeters (5.2 to 6.4 inches). It is capable of great distention, in certain pathologic conditions sometimes assuming enormous proportions. In its empty state the movable rectum is flattened from before backward, its anterior and posterior walls lying in apposition. Section of the gut in this situation shows the lumen merely as a transverse slit an inch or more in length.

Structure of the Movable Rectum.

Like the other portions of the intestinal canal the movable rectum is composed of four coats: the serous or peritoneal, the muscular, the submucous, and the mucous. Each of these presents certain important and distinctive features, and must be considered in detail.

PLATE II.



Rectum distended with bismuth-buttermilk mixture, showing location of the rectal valves.

The Serous Coat of the movable rectum is incomplete, but little more than one-half the organ, as a rule, being invested by it. Beginning above where the attachment of the sigmoid mesentery ends (opposite the third sacral vertebra), it entirely surrounds the gut for a short distance, binding it down closely to the posterior pelvic wall and forming what is sometimes, though incorrectly, described as the *mesorectum*.

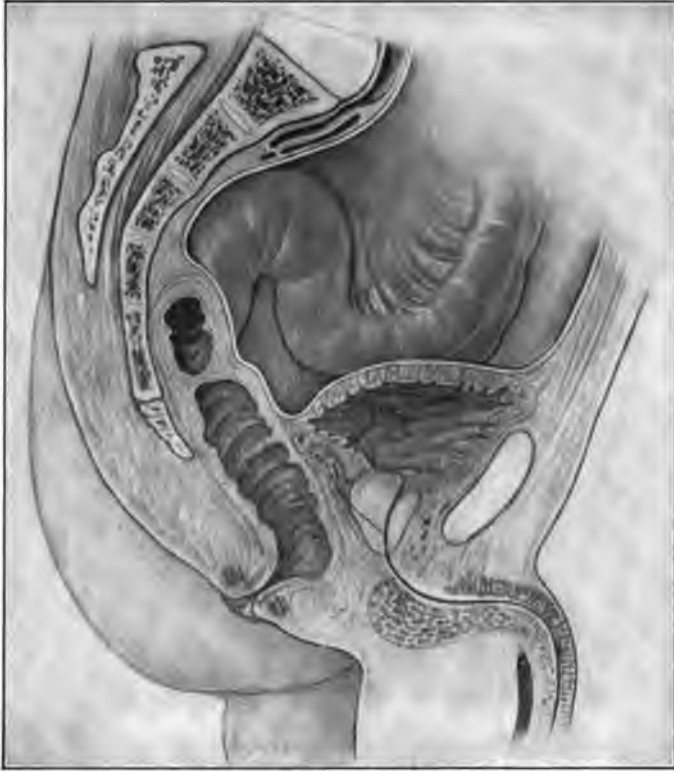


Fig. 3.—Relation of serous coat to rectum.

The two layers of peritoneum of which the coat is composed in this situation quickly separate and, passing downward in an oblique direction along the lateral walls of the rectum, leave the anterior surface to be reflected, in the male, on to the base of the bladder, forming the rectovesical pouch, and, in the female, on to the vagina and uterus, forming the *cul-de-sac* of Douglas (Fig. 3). The point at which this reflection occurs in the former case is about one inch above the prostate gland, in the latter about twice that distance above the superior surface of the pelvic floor.

It will thus be seen that the posterior surface of the movable rectum, in the median line at least, is devoid of peritoneal covering practically throughout its whole extent. An increasing amount of the lateral surface is uncovered as the peritoneum passes downward and forward; below the point of reflection of this membrane the rectum is entirely destitute of peritoneal investment. The larger portion of the rectum, as suggested by Cunningham, thus appears to lie behind and beneath the pelvic peritoneum, the mobility and distensibility requisite to its function being in this way provided for.

The distance between the anus and the site at which the peritoneal coat leaves the front of the rectum is a matter of great practical importance in operations in this region. No definite figures can be stated. Age, sex, and the degree of distention both of the rectum and other pelvic organs are factors to be reckoned with. In the adult male, with the rectum and bladder both empty, an approximate estimate of the distance would be three inches; in the female, probably one-half inch less.

The Muscular Coat, like that of the colon, is composed of two layers, an external longitudinal layer and an internal circular layer. It differs from the muscular coat of the colon in being thicker and stronger, and also to some extent in its arrangement.

The **longitudinal layer** is the prolongation of the three teniæ of the colon. As already noted, these coalesce at the lower portion of the sigmoid to form a broad anterior and posterior band.

As the rectosigmoid junction is approached a further spreading out occurs, so that the rectum becomes completely surrounded by longitudinal fibers, which are, however, much thicker upon the anterior and posterior than upon the lateral surfaces.

The longitudinal layer of the muscular coat is the shortest structure entering into the formation of the rectal wall. To this fact is due the characteristic lateral foldings which here replace the sacculations of the colon. These foldings or flexures occur in the lateral walls of the bowel for the reason that here the longitudinal layer is thinnest and weakest, and the gut consequently least resistant. They are usually three in number, placed on alternate sides of the bowel, and marked externally by deep grooves or creases, which occupy more or less horizontal positions and involve from one-quarter to two-thirds of the circumference of the gut.

An additional and very constant flexure occurs at the juncture of the rectum with the pelvic colon, being located on the right or left side according to the direction of the bend at this point. Internally, corresponding, as a rule, quite accurately with the grooves on the external

surface, prominent shelf-like projections appear, which are known as the *rectal valves* (see page 10). Occasionally a few of the innermost fibers of the longitudinal layer dip into the flexures, but more frequently the entire layer spans them. Below, this layer terminates by its outer fibers being inserted with the levatores ani into the rectal wall, its inner fibers continuing down between the internal and external sphincters to be inserted by tendinous processes into the skin about the anus.

The **circular layer** of the muscular coat is the continuation of the same layer as found in the colon. It presents marked aggregations of its fibers at sites corresponding to the bases of the rectal valves, into the structure of which this layer uniformly enters. At its termination a great thickening or reinforcement of this layer occurs to form the internal sphincter muscle (see page 18).

The **Submucous Coat** is composed of a meshwork of loose areolar tissue, much more abundant here than in other portions of the intestinal tract, in which the blood-vessels, nerves, and lymphatics ramify. To the abundance of this coat is due the free mobility of the mucous membrane, which enables it to adapt itself to the varying contents of the rectum, and also to escape injury when hardened feces are present or being voided. This same fact likewise accounts for the possibility of prolapse of the mucous coat, a not infrequent pathologic condition.

The **Mucous Coat** of the movable rectum is thicker, more freely movable and, owing to its greater vascularity, redder in color than that of the colon. In the empty state it presents numerous more or less transverse superficial folds or rugæ, which disappear upon distention. In addition it presents a limited number (2 to 6) of permanent crescentic folds, into the formation of which not only the mucosa but also one or more of the other tunics of the bowel enter, and which are *rendered more prominent upon distention*. These latter are the *rectal valves*, and will be more fully described in a subsequent portion of this chapter (see page 10).

The epithelial layer, like that of the other portions of the intestinal tube, is of the columnar type, excepting below, where it merges into the stratified variety characteristic of the proximal portion of the anal canal.

Many tubular glands (crypts of Lieberkühn) and solitary follicles are found in the rectal mucosa. The former provide for the well-known and important absorptive function of the organ, and also furnish the mucus necessary for lubrication. The location of the solitary follicles is marked by minute depressions or pits, which are visible to the naked eye on careful inspection.

The Rectal Valves, or Valves of Houston.

The anatomic existence of the rectal valves (Figs. 4 and 5) was for a number of years in the recent past the subject of vigorous controversy in the medical press as well as upon the floor of medical societies. Today their reality and constant presence are universally admitted even by those who were formerly most vehement in their denials. The classic description of these structures by Houston, of



Fig. 4.—The rectal valves in axial section of rectum (longitudinal).

Dublin, in 1830,¹ has been verified and confirmed in all essential respects by many observers. Questions of pathology remain undetermined, but the facts of anatomy may be considered as established for all time.

The rectal valves are permanent, shelf-like, crescent-shaped folds or plicæ which project into the lumen of the movable rectum from alternate sides of its lateral aspects. Ineffaceable under all conditions, unlike the mucous folds or rugæ, they become most prominent when the organ is fully distended. Three valves are always present, though there may be several more,—in exceptional cases even as many as six

¹ Dublin Hospital Reports, vol. v, pp. 158-164.

or seven. Their arrangement with reference to the bowel is subject to considerable variation, but quite constant with respect to each other.

The highest valve is found at the rectosigmoid junction corresponding accurately with the bowel flexure at this point. According to the author's observation the direction of this flexure in the majority of cases is toward the right and the valve is therefore oftenest found projecting from the right anterior aspect of the bowel. This valve is constant in its presence, definite in its location and, as a rule, is well developed. The next valve stands out from the left posterior wall some two inches



Fig. 5.—Proctoscopic appearance of rectal valves. (After *Tuttle*.)

lower down, being distant from the anal margin about five inches. The third valve (counting from above downward) springs from the right anterior quadrant of the rectal wall approximately one inch lower down, being therefore distant from the anus, on the average, about four inches. As a rule, this is the most prominent of the valves and accords in its location quite closely with the level at which the reflection of the peritoneal coat takes place. A fourth valve can usually be demonstrated attached along the posterior wall near the lower end of the movable rectum. Generally speaking, this valve is more or less rudimentary and, not infrequently, is absent altogether.

The extent of attachment of the rectal valves to the wall of the bowel varies from one-half to two-thirds of its circumference. The

extent of their projection into the lumen is also variable, depending largely on the degree of rectal distention at the time of investigation and being always greatest at the valve centers. The free margins of the valves are crescent-shaped and, in the normal condition, thin and flexible. Their bases are much thicker and usually join the bowel wall in a line which forms a slight angle with the horizontal, so that the planes of the superior valve surfaces are inclined both downward and laterally.

Histologically, the valves do not differ from the other portions of the rectal wall. Internally they are covered by the mucosa, which is somewhat thicker at the apex than at the base. Beneath this coat is the submucosa, which is usually greatly increased in thickness, sometimes forming the larger portion of the structure of the valve. The circular layer of the muscular coat enters into the valves to a variable extent and in certain instances the longitudinal layer also. In exceptional cases the peritoneal coat may dip into the bases of the valves for a short distance, though the rule is that both this tunic and the greater part of the longitudinal layer of the muscular tunic merely span the depressions which mark the sites of the valves externally. The blood-supply of the valves is abundant and is furnished by separate vessels which enter each valve at its base.

The following table shows the actual measurements and relative position of the rectal valves in one of many dissections made by the author. The figures may be taken as fairly representing the average:—

	First valve.	Second valve.	Third valve.
Diameter of rectum at level of valve.	6.0 cm. (2.44 in.)	7 cm. (2.8 in.)	5.2 cm. (2.1 in.)
Height of apex of valve from periphery.	1.7 cm. (.68 in.)	2.9 cm. (1.76 in.)	1.5 cm. (.6 in.)
Proportion of circumference embraced by valve.	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{3}$
Distance from anus.	9 cm. (3.6 in.)	12.5 cm. (5 in.)	17 cm. (6.8 in.)

From the foregoing description it is clear that the rectal valves are definite, independent anatomic structures, and that their position and arrangement are such as to divide the rectum into several separate compartments and form a spiral track down its interior. Their function readily suggests itself, namely, to support the fecal mass and prevent its too rapid descent in the act of defecation. They represent nature's special adaptation of the organ to the erect posture of man.

Beneficent in plan and purpose under normal conditions, when congenitally abnormal in development or the subject of pathologic changes, the rectal valves become disease factors which must be recognized and reckoned with. Their pathologic significance will be more specifically referred to in the subsequent chapters of this work.

General Relations of the Movable Rectum.

Anteriorly the movable rectum is separated from the other pelvic organs in its upper part by the peritoneal pouch formed by the reflection of its serous coat, which usually contains coils of small intestine and often also the dependent loop of the pelvic colon. Below the peritoneal portion it is in relation, in the male, with the base of the bladder, the seminal vesicles, the prostate gland, and the membranous urethra, from which structures it is separated by the rectovesical layer of the pelvic fascia; in the female it lies close in contact with the posterior vaginal wall, with which it is intimately connected.

Posteriorly the rectum lies in the concavity formed by the sacrum and coccyx above; below it rests upon the sloping upper surface of the levator ani muscles where they meet to complete the posterior portion of the pelvic floor. Interposed between these structures and the bowel is an abundant layer of areolar connective tissue in which the blood-vessels, nerves, and lymphatics ramify. This cellular layer completely invests all that portion of the movable rectum not covered by the peritoneal coat. It contains a considerable amount of fat in its meshes and represents the continuation or prolongation of the subperitoneal tissue as found in the abdominal cavity.

Lateral relations can properly be said to exist only when the rectum is distended. When in this state, in addition to the small intestine, the sacral vessels and nerves and the pyriformis muscle may be said to be in relation with it on each side at its upper part. Below, the levator ani muscles constitute its lateral relations.

The Anal Canal.

The anal canal, or fixed rectum (Fig. 6), is the constricted passageway through the pelvic floor by means of which the intestinal tube is connected with the exterior of the body. It is one to one and one-half inches in length and has its lateral walls in apposition when quiescent. It begins where the movable rectum terminates, *i.e.*, at the level of the upper surface of the pelvic floor, and ends at the anal orifice. Its direction is downward and backward, its axis forming an angle with the horizon of from 60 to 80 degrees in the erect position. Should the

anal canal maintain the direction of the movable rectum the anus would be placed, in the male, just behind the root of the scrotum; in the female, close to the vaginal orifice. This is an important practical point and should be clearly understood.

The lining membrane of the anal canal is composed of modified mucosa above, modified skin below. At its upper extremity, where the bowel contracts abruptly to pass between the mesial borders of the levator ani muscles, the mucous membrane is thrown into longitudinal ridges six or eight in number, called the *columns of Morgagni*; between the lower ends of these ridges the mucous membrane is arranged in little semilunar folds known as the *anal valves*, above which small pockets

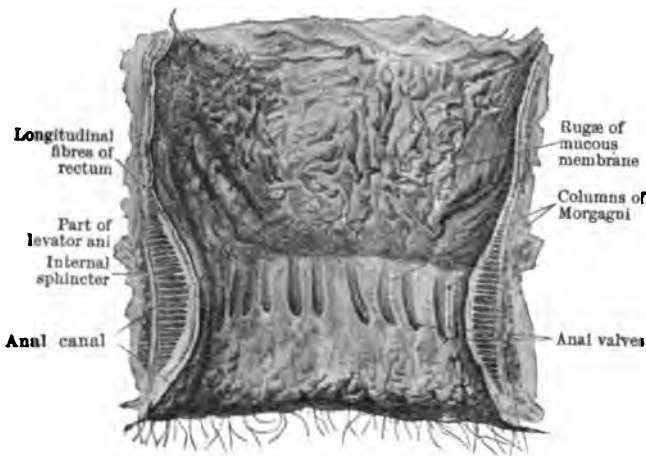


Fig. 6.—Anal canal laid open. (Cunningham.)

or saccules are found. Around the passage in this situation minute elevations of the mucous membrane, the so-called *papillæ*, are met with, which sometimes, as the result of pathologic changes, are greatly hypertrophied and can be felt on digital exploration (Fig. 7).

The White Line of Hilton (anorectal line) marks the junction of the skin and mucous membrane. This is situated near the center of the anal canal, corresponding with the lower border of the internal sphincter muscle. It is seldom to be recognized as a *white line* in the living subject, though a circular depression, perceptible both to sight and touch, can usually be recognized at the level indicated. The zone of mucous membrane immediately above Hilton's white line, corresponding to the area of the anal valves and papillæ, is minutely described by Stroud,² who terms it the "pecten" and considers it endowed with a special rectal sense.

² Annals of Surgery, 1896, vol. xxiv, p. 1.

Below Hilton's white line the canal is lined by modified skin, which is covered by squamous epithelium, merging into the ordinary type at the anal opening.

The Anus, or anal orifice, is situated in the anteroposterior diameter of the pelvic outlet, just behind an imaginary line drawn between the two ischial tuberosities and a little more than one inch in front of



Fig. 7.—Anal valves and papillæ. (C. F. Martin.)

(and below) the tip of the coccyx. When in repose its lateral margins are maintained in apposition by the contracted external sphincter, the opening appearing merely as an anteroposterior slit about one inch in length (Fig. 8). The perineal skin is usually pigmented and is thrown into radiating folds by the joint action of the corrugator cutis ani and external sphincter muscles. These folds are obliterated when the anus is distended. The skin in this situation is provided with sebaceous and sweat glands, and numerous short, crispy hairs grow from it.

The *conformation* of the anal region varies greatly in different subjects. As a general rule, when the parts are at rest the anus is placed at the deepest portion of a shallow concave furrow extending from the coccyx to the central point of the perineum, and is only to be seen when the nates are retracted. Occasionally it is so deeply placed as to be difficult of access for examination and treatment; while, on the other

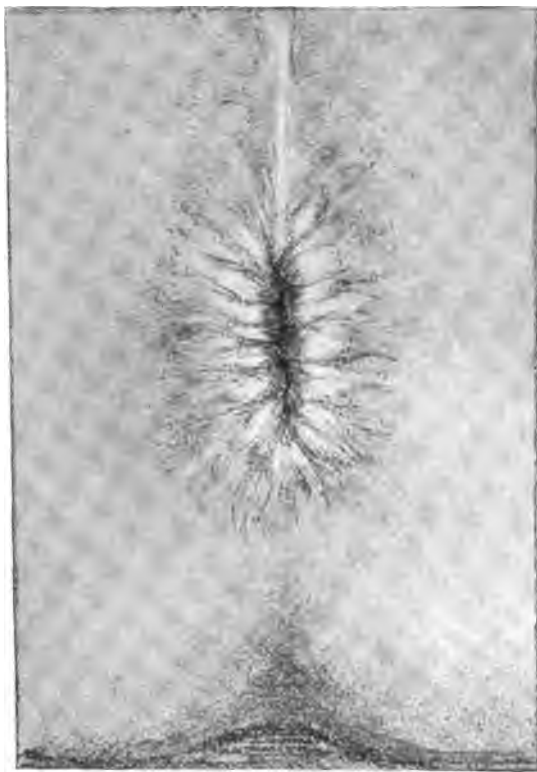


Fig. 8.—Normal anus.

hand, the exterior of the pelvic floor sometimes appears to be almost a plane surface with only a slight depression at the site of the anal aperture.

Relations of the Anal Canal.—The anal canal is *surrounded* throughout by a strong muscular cylinder which is formed from above downward by the levator ani, the internal sphincter, and the external sphincter muscles. In addition, *anteriorly* it is in relation, in the male, with the bulb of the urethra, the base of the triangular ligament, and the perineal body; in the female, with a small portion of the posterior wall of the vagina and the perineal body. *Laterally* it is in relation with

the ischio-rectal fossæ, from which it is separated by the perianal fascia and the sphincter muscles. *Posteriorly* is a mass of fibrous and muscular tissue, the *anococcygeal body*, interposed between it and the tip of the coccyx.

Muscles.

The muscles mentioned above as surrounding the anal canal are of such practical importance in their relations and actions as to require more extended consideration (Fig. 9).

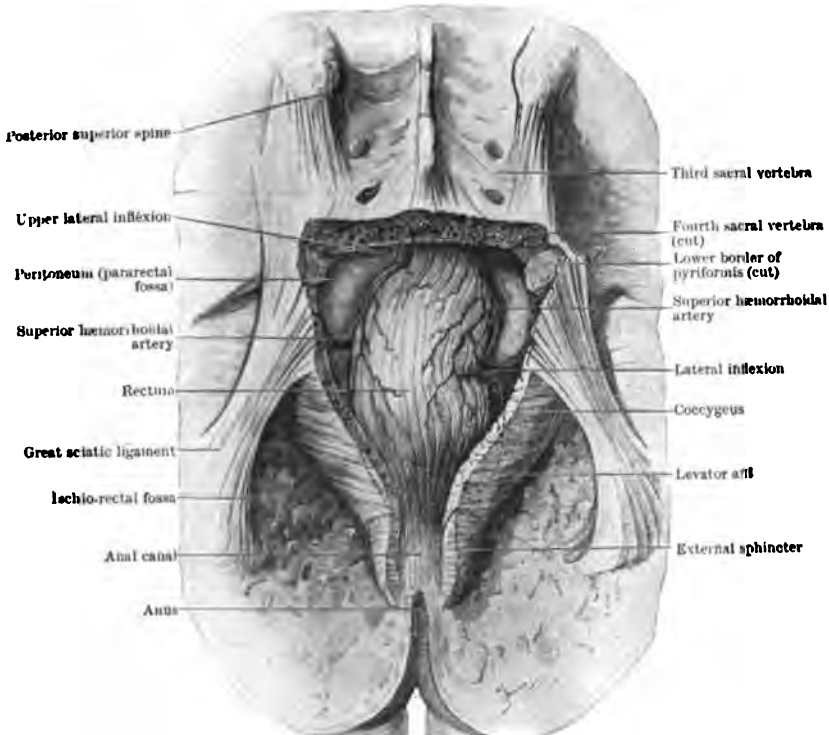


Fig. 9.—The rectum from behind.

The External Sphincter (*sphincter ani externus*) is the most perfect example of sphincter muscle found in the body. It is composed of striated or voluntary muscle-fibers, and is quite superficially placed, being covered only by the integument and superficial fascia of the anal region. It arises from the dorsal surface of the tip of the coccyx and the contiguous portion of the anococcygeal ligament and, after separating to embrace the distal half of the anal canal, is inserted into the central point of the perineum. In woman its fibers are continued into the

sphincter vaginæ. Upon careful dissection it is seen to be composed of two portions, superficial and deep, between which a part of the fibers of the longitudinal layer of the muscular coat of the bowel descend to reach the skin around the anal opening. The superficial portion is subcutaneous, many of its fibers being inserted into the perianal skin, and is inseparable from the *corrugator cutis ani muscle* described by some authors. The deep portion closely invests the lower half-inch or more of the anal canal, and at its upper extremity partially embraces the internal sphincter muscle.

It has long been the teaching that the external sphincter, under normal conditions, remains in a state of tonic contraction. Expressed in different terms this can only mean that *when at rest it is in a state of activity*—a self-evident absurdity. It is unthinkable that nature should depart from established law in fashioning any voluntary muscle so that it would require the constant expenditure of nerve energy to maintain it in a state of rest. True, the external sphincter does close the distal portion of the anal canal, holding its lateral walls in apposition and converting the anal aperture, as above mentioned, into an anteroposterior slit. But this action is to be explained rather by the shape of the muscle and the arrangement of its fibers than by the irrational conception of “tonic contraction.” The truth is that its office in closing the anus is purely passive. Composed of striated muscle-fibers, it is voluntary in the same sense and to the same extent as other voluntary muscles, *i.e.*, it is capable of being contracted at will. Contraction of a sphincter muscle results in forcible closure of the opening it guards. The function of the external sphincter, therefore, which grows out of its action as a voluntary muscle, is, under the direction of the will, to oppose or terminate the act of defecation. The volitional control of the muscle is supplemented by that of a reflex center situated in the lumbar enlargement of the cord, which is capable to a certain extent of carrying out its function, even when separated from the brain.

The nerve-supply of the external sphincter is derived from the inferior hemorrhoidal branch of the internal pudic and the perineal branch of the fourth sacral nerves.

The Internal Sphincter (*sphincter ani internus*) is merely a thickened band or aggregation of the circular muscular fibers of the bowel which surround the upper portion of the anal canal to the average extent of half an inch. It is composed entirely of involuntary fibers which are directly continuous and identical in structure with the circular fibers of the muscular tunic of the rectum. Its lower portion, to a variable extent, is placed within the grasp of the external sphincter, a line of demarcation between the two being perceptible to touch as a shallow groove or

furrow (see Fig. 7). This is the weak point in the anal canal, and it is here that the internal openings of fistulas are to be found in a large majority of cases.

There is no occasion to credit the internal sphincter with any special action in addition to that of the circular coat of the bowel of which it is a part. By reason of its location and thickness it probably exercises some passive sphincter control; but its chief action is undoubtedly that of a detrusor, serving to complete the expulsion of feces and keep the anal canal free of contents. Its nerve-supply is derived from the sympathetic system through the pelvic plexuses.

The Levator Ani muscle, with its fellow of the opposite side (Fig. 9), constitutes the so-called diaphragm of the pelvis. It is composed of a number of strong, flattened bundles of muscle-fibers partially separated from each other by cellular intervals, to which different names are sometimes assigned, *e.g.*, *puborectalis*, *pubococcygeus*, etc. It arises from the pelvic aspect of the body of the os pubis near the symphysis, from the white line which marks the junction of the obturator and pelvic fasciæ, and from the internal surface of the spine of the ischium. From this extensive origin the fibers pass in general terms downward, inward and backward, some to blend with the fibers of the companion muscle in the median line in front of and behind the rectum to complete the pelvic floor, others to be inserted into the upper part of the anal canal at the level of the internal sphincter, a few continuing down to unite with the upper margin of the external sphincter. The most posterior fibers, those arising from the spine of the ischium, are inserted into the border of the coccyx. It will thus be seen that the levatores ani constitute the sphincter of the upper part of the anal canal, holding the lateral walls in apposition in this situation just as the external sphincter does below.

Considerable difference of opinion is expressed, by the various writers on the subject, as to the exact anatomic relations and action of this muscle with reference to the rectum. The contention of Cripps,³ that when the two muscles act simultaneously the lateral walls of the rectum above their point of attachment are compressed between them, is undoubtedly correct, as the author has repeatedly demonstrated (Fig. 9). To understand this it is only necessary to remember (1) that the upper or pelvic surface of these muscles presents a deep, funnel-shaped concavity, the anal canal beginning at the lowest point, where the bowel pierces the pelvic floor; (2) that the strong bundles of fibers which unite immediately behind the rectum arise in front from the pubis and

³ Diseases of the Rectum and Anus, 2d edition, p. 9.

anterior portion of the fascial line and pass backward and downward in close relation with the lateral walls of the rectum, crossing it obliquely above the upper limit of the anal canal. Consequently, when the two muscles contract together the bowel at this point is necessarily constricted or "pinched in" to a greater or less degree. This action of the muscles can usually be demonstrated to the sense of touch by having the subject strongly contract the parts upon the finger introduced to its full length, and doubtless serves to voluntarily aid or hasten the completion of the act of defecation.

In addition to the actions mentioned, when the two levators contract together they raise and support the anal canal as a whole, at the same time that they assist powerfully in effecting and maintaining its voluntary closure. The well-known difficulty in voiding urine while a costive stool is being expelled, which is usually attributed to the action of these muscles, is doubtless due rather to the mechanical pressure of the fecal mass upon the prostatic and membranous urethra, since at the time of defecation the levators, like the external sphincter, are necessarily in what may be termed a state of forced relaxation.

The levator ani is a voluntary muscle and receives its nerve supply from the third and fourth sacral nerves and from the perineal branches of the internal pudic.

Ischiorectal Fossæ.—On each side of the anal canal, interposed between it and the lateral wall of the bony pelvis, is a large, irregular-shaped space filled with coarse fat supported by a strong connective-tissue framework, which serves as a pad or cushion to protect the bowel from injury in distention. This space is the ischiorectal fossa. It is more or less pyramidal or wedge-shaped, the base being directed downward and corresponding with the skin surface, the apex upward and formed by the junction of the obturator and anal fasciæ. It is about two and one-half inches in depth and is separated from the pelvic cavity by the levator ani muscle. The internal boundary of the fossa is formed from above downward by the inferior surface of the levator ani muscle and the anal canal, both of which are covered by the anal fascia. Anteriorly its wall is formed by the obturator internus muscle and the obturator fascia; posteriorly by the gluteus maximus muscle, the great sacrosciatic ligament, and the pelvic fascia; and externally, where the anterior and posterior walls converge, are the tuberosity and body of the ischium. The inferior hemorrhoidal vessels and nerve cross the posterior portion of the fossa in a direction forward and inward to reach the anal region.

It will be noted that the boundaries of the fossa are strengthened throughout by a fascial lining, *except at the base*, in consequence of which abscesses of this space usually "point" on the skin surface. Posteriorly

the two fossæ are connected by a narrow cellular interval between the levator ani muscles and the coccygeal attachment of the external sphincter. This constitutes a weak spot and explains the frequency with which the pus of an ischio-rectal abscess finds its way into the opposite fossa to produce horseshoe fistula.

Other *perirectal* spaces (Fig. 10), situated above the levator ani muscles, and therefore in the pelvic cavity, are described under the names *superior pelvirectal* and *retrorectal spaces*. The former are two in number and are in relation with the anterolateral aspects of the gut, separating it

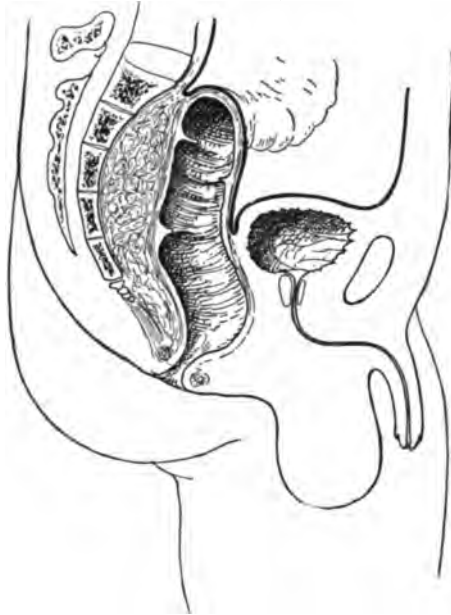


Fig. 10.—Retrorectal space.

from the seminal vesicles and bladder in the male, from the uterus and its adnexa in the female; the latter, as its name implies, lies behind the rectum, between it and the sacrum. Any limitations assigned to these spaces must necessarily be to greater or less extent arbitrary and indefinite, and therefore confusing. It seems best to the author in this connection merely to emphasize the anatomic fact already referred to, that all that portion of the movable rectum not provided with a peritoneal covering is surrounded by and imbedded in the loose subperitoneal connective tissue, which is somewhat more abundant at the sites indicated than elsewhere. This tissue is of low resistance and readily becomes infected from disease processes in the bowel or other pelvic viscera.

When this occurs perirectal abscess located *above* the levator ani muscles is the result.

Vascular Supply of the Rectum and Anus.

The Arteries.—The arteries of the rectum and anus are six in number, as follows:—

The superior hemorrhoidal.

The two middle hemorrhoidal.

The two (or more) inferior hemorrhoidal.

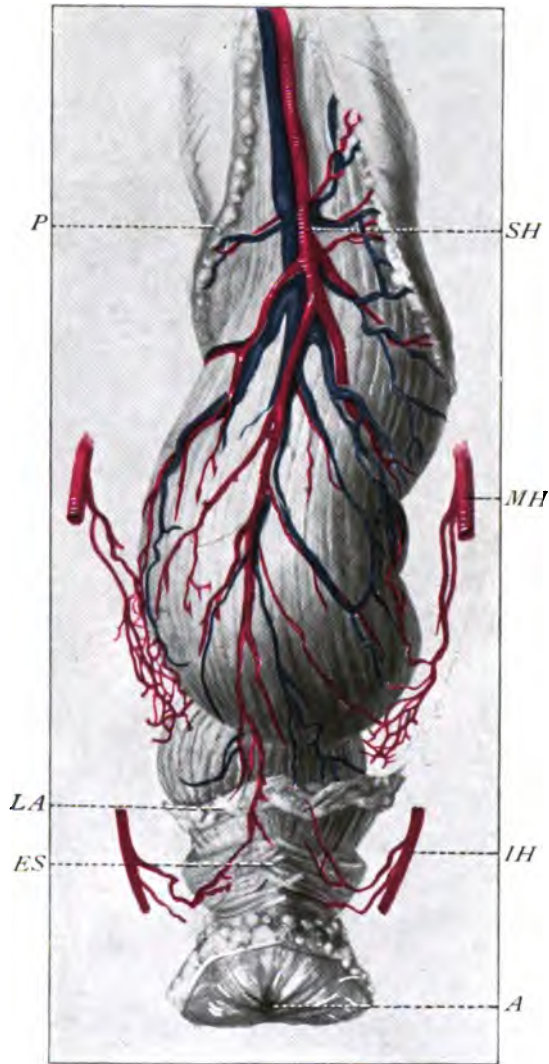
The middle sacral.

The **superior hemorrhoidal artery** is the direct continuation of the inferior mesenteric, of which it is the terminal trunk. It descends for a short distance between the two layers of the pelvic mesocolon and at the beginning of the rectum lies in the posterior median line external to the muscular coat. It soon divides into two branches, which course downward along the sides of the rectum. Just above the middle of this organ each of these main branches subdivides into a number of secondary branches (3 or 4 on each side), which penetrate the muscular coat and descend longitudinally in the submucosa to terminate about the upper level of the anal canal by anastomosing with each other and with the terminal branches of the middle and, to less extent, inferior hemorrhoidal arteries. At the lower part of the movable rectum one of these branches accompanied by a corresponding vein is usually to be found lying between each two adjacent columns of Morgagni. (See Plate III.)

The **middle hemorrhoidal arteries**, one on each side, usually arise from the anterior trunk of the internal iliac, though they may arise from the inferior vesical and occasionally from the internal pudic. They run downward and inward along the pelvic surface of the levator ani muscles to reach the bowel about the upper margin of the internal sphincter, where they anastomose freely with each other and with the superior hemorrhoidal above and the inferior hemorrhoidal below. These arteries also supply blood to the bladder, seminal vesicles, and prostate in the male, and to the upper part of the vagina in the female. (See Plate III.)

The **inferior hemorrhoidal artery** is usually single, but may consist of two or more branches on each side. It is given off from the internal pudic as that vessel lies in Alcock's canal. After piercing the obturator fascia to enter the ischiorectal fossa, it traverses the posterior part of that space in a direction inward and slightly forward, becoming more superficial as it approaches the anal region. It supplies the perianal integument and the sphincter muscles, and terminates by anastomosing freely beneath the mucous membrane with its fellow of the opposite

PLATE III.



Blood-vessels of the rectum. (After Ball.)

SH, superior hemorrhoidal artery; *MH*, middle hemorrhoidal artery; *IH*, inferior hemorrhoidal artery; *A*, anus; *ES*, external sphincter muscle; *LA*, levator ani muscles; *P*, cut edge of peritoneum.

side, and also with the middle and inferior hemorrhoidal arteries. (See Plate III.)

The **middle sacral artery** (*sacra media*) arises from the posterior aspect of the abdominal aorta at its point of bifurcation and passes down on the anterior surface of the sacrum and coccyx to terminate in Luschka's

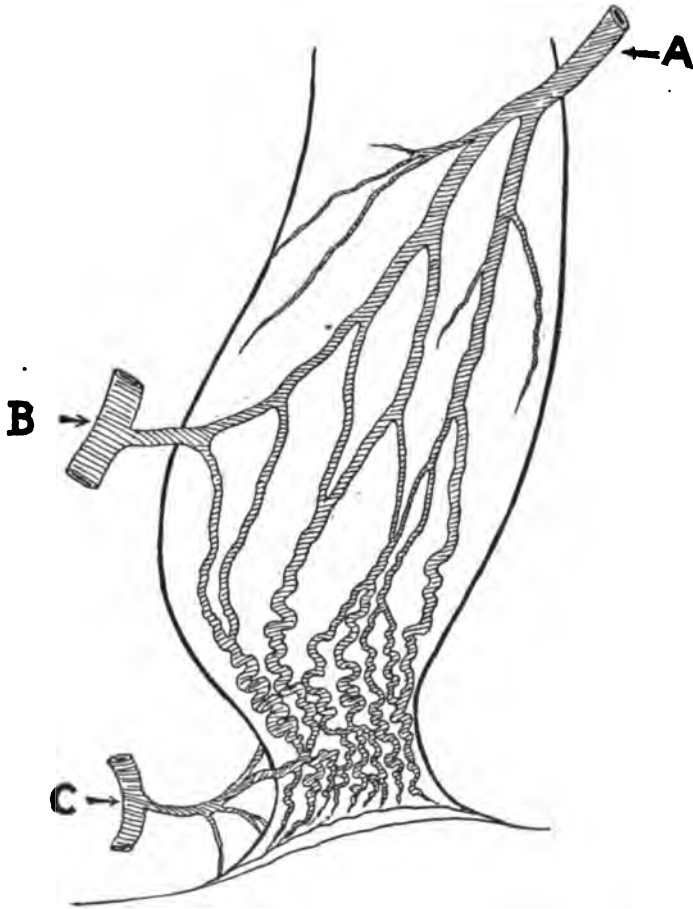


Fig. 11.—Venous plexuses. *A*, superior hemorrhoidal plexus; *B*, middle hemorrhoidal plexus; *C*, inferior hemorrhoidal plexus.

gland. In its course it gives off a number of branches, which are distributed to the posterior wall of the rectum, inosculating with the superior hemorrhoidal and, below, with the middle hemorrhoidal arteries.

The Veins.—The veins of the anorectal region correspond in number, arrangement, and course to the arteries as above described. They are divisible into two sets, or systems, one of which collects the blood

chiefly from the mucous membrane of the rectum proper and, as might be inferred in view of the absorptive function of this organ, transmits it to the portal vein; the other collects the blood principally from the muscular walls both of the movable rectum and anal canal, and from the perirectal tissues, and conveys it to the vena cava. The former set comprises the superior hemorrhoidal plexus; the latter, the middle and inferior hemorrhoidal plexuses. Free anastomosis takes place between the two systems, chiefly at the lower end of the anal canal, the most noteworthy site of the communication between the portal and systemic veins being at this point (Fig. 11).

The **superior hemorrhoidal plexus** begins in a series of minute venous expansions lying in the submucosa and surrounding the bowel at the upper margin of the internal sphincter. These little expansions or pools are connected below with the inferior hemorrhoidal plexus by a number of minute branches, which may be traced beneath the mucocutaneous lining of the anal canal. Above, each little pool gives off one or more small branches, which anastomose to form an intricate venous plexus about the lower end of the rectum. From this plexus larger branches proceed upward in company with the arteries and gradually unite to form trunks of considerable size. About midway of the movable rectum, these trunks, 6 to 10 in number, pierce the muscular coat and converge on the lateral aspects of the gut into two large veins, which unite still higher up to form the superior hemorrhoidal vein.

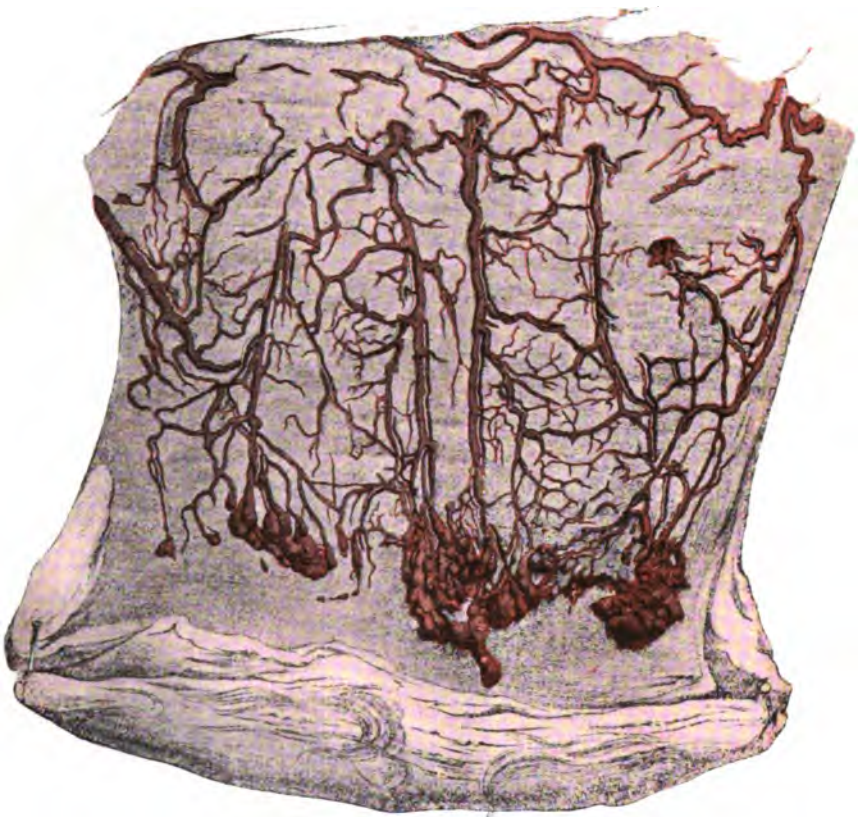
Like the other radicles of the portal system, the superior hemorrhoidal vein and its branches are destitute of valves. This anatomic construction favors venous engorgement and is one of the underlying factors in the etiology of internal hemorrhoids.

The **middle hemorrhoidal plexus** is formed about that portion of the movable rectum lying between the peritoneal reflection and the levator ani muscles, and is most marked on the anterior and lateral walls of the gut. It drains the parts supplied by the middle hemorrhoidal arteries, viz., part of the base of the bladder, seminal vesicles, and prostate gland, as well as the muscular walls of the rectum, the levator ani muscles, and the perirectal tissue, returning the blood through veins of the same name to the internal iliac veins. It communicates freely posteriorly with the sacral veins, and, to a lesser extent, above with the superior hemorrhoidal plexus and below with the inferior hemorrhoidal plexus, though these latter anastomoses are said by Goodsall and Miles⁴ to be very slight.

The **inferior hemorrhoidal plexus** lies beneath the integument of the anal margin and corresponds to the distribution of the inferior

⁴ Diseases of the Anus and Rectum, part i, p. 31.

PLATE IV.



Rectal circulation, showing superior hemorrhoidal arteries and veins.

hemorrhoidal arteries. It collects the blood from the muscles and lower half of the lining membrane of the anal canal and from the perianal tissues, and conveys it to the internal pudic veins. As already stated, this plexus communicates with the superior hemorrhoidal plexus by means of a number of small branches which run beneath the mucocutaneous membrane of the anal canal. Its connection with the middle hemorrhoidal plexus is very limited and probably occurs chiefly in the substance of the levator ani muscles in the immediate vicinity of their attachment to the bowel wall. The thrombotic variety of external hemorrhoids results from the rupture of one or more of the venules of this plexus with the formation of a clot or clots in the cellular tissue.

The middle and inferior hemorrhoidal veins, like the other tributaries of the general systemic circulation, are provided with valves. For this reason the plexuses in which they originate can be only imperfectly injected through the main trunks. On the other hand, it is possible to inject the superior or internal plexus through the superior hemorrhoidal vein and at the same time demonstrate experimentally the anastomosis between this plexus and the one surrounding the anal opening. Clinically this anastomosis may not infrequently be observed in operating upon the externointernal type of hemorrhoids, particularly where the subject is an old person with thin, relaxed tissues. (See Plate IV.)

Lymphatics of the Rectum and Anus.

The lymphatics of the rectum and anus correspond in their general arrangement with the blood-vessels of this region. Those from the mucous membrane of the movable rectum follow the course of the superior hemorrhoidal veins and terminate in the sacral glands. Those from the lower half of the anal canal and perianal tissues find their way along the cruroscrotal folds and join the superficial glands in the inguinal region above Poupart's ligament.

In addition to these well-recognized sets, another set of absorbent vessels is described by some writers as accompanying the middle hemorrhoidal veins from the lower portion of the movable rectum to terminate in glands lying along the course of the iliac vessels.

The importance of bearing in mind the course and termination of the lymphatics is obvious when the frequency with which glandular involvement becomes a factor in the diagnosis of suspicious cases is remembered.

Nerve Supply of the Rectum and Anus.

Like the veins and lymphatics, the nerves of the rectum and anus are divided into two more or less distinct sets. In a general way it

may be said that the nerve-supply of the rectum proper is furnished by the sympathetic system, while that of the anal canal is derived from the spinal cord. The fibers from the sympathetic system are given off from the inferior mesenteric and the two pelvic plexuses, following the course of the superior and middle hemorrhoidal vessels respectively. They are distributed to the walls of the movable rectum, including the internal sphincter muscle and subjacent mucosa, being arranged here as throughout the intestinal tract in two plexiform networks, one (Auerbach's plexus) lying between the longitudinal and circular layers of the muscular coat, the other (Meissner's plexus) ramifying in the submucosa. This part of the rectum is very scantily supplied with sensory nerve-fibers, in consequence of which even the most formidable lesion may be attended by little or no pain in its development.

The anal canal, with the exception of the internal sphincter, is innervated by cerebrospinal fibers from the third and fourth sacral and internal pudic nerves, which also supply the integument of the perianal region. The perianal integument receives additional filaments, posteriorly from the plexus formed by the last three spinal nerves and anteriorly from the perineal branch of the internal pudic.

The inferior hemorrhoidal nerve, after supplying the external sphincter, is distributed to the mucocutaneous lining of the anal canal, which is provided with an abundance of sensory fibers throughout. The upper portion of this structure is remarkable in the fact that it is profusely supplied with fibers from both great nervous systems.

In contrast to the movable rectum the anal canal, by reason of its abundant supply of spinal fibers, is among the most sensitive regions in the body. Here trifling lesions often occasion acute pain, and operations on this part require the profoundest anesthesia. The frequent occurrence of reflex pains from this region finds anatomic explanation in the fact that the nerves which supply it also supply adjacent organs and muscles and, further, at the point where they join the cord are in intimate relation with the origin of other nerves destined for remote parts. Thus, the pain of an anal fissure may be referred to the neck of the bladder on the one hand, and to any of the parts supplied by the branches of the lumbar or sacral plexus on the other.

Development of the Rectum and Anus.

The observant reader of the foregoing pages cannot have failed to note the uniform arrangement of the structures described into two more or less separate and distinct sets, corresponding with the divisions of the organ into movable rectum and anal canal. This dual arrangement is

suggestive, and a glance at the embryology of the parts shows it to be in strict conformity with nature's plan of development.

The three layers of the blastodermic membrane all take part in the formation of the primitive alimentary tube, the ectoderm appearing at the extremities, the entoderm furnishing the epithelial lining, and the mesoderm the remainder of the walls of the tube. At first it is a simple straight tube, closed at either end, and to facilitate description is divided into three parts called the foregut, the midgut and the hindgut. About the second month of fetal life an invagination from the surface at the point which is to be the anus begins to take place toward the closed extremity, or cloaca, of the hindgut. This invagination, known as the proctodeum, increases until only a membrane consisting of the ectoderm or epiblast, and entoderm or hypoblast, separates it from the cavity of the alimentary tube. With the disappearance of this membrane, which is supposed to occur sometime during the third month of fetal life, the communication between the embryonic rectum and anal canal is established. Lining the zone where this union occurs is found the transitional mucocutaneous tissue heretofore referred to, and the special structure described by Stroud as the "pecten."

Thus it appears that early in fetal life the differentiation between rectum and anal canal is clearly marked,—a differentiation which persists and is emphasized during the further steps of the developmental process. The division of the organ into two parts is therefore both logical and natural, and it is not surprising to find that the teachings of histology and gross anatomy are in perfect accord with those of embryology upon the subject.

PHYSIOLOGY.

In all nature nourishment and waste go hand in hand. This is a basic principle of life. In the sense of entire assimilation there is no perfect food, and the important function by which the useless residue is discarded from the body is entitled to a few words of special consideration in these pages.

The length of time required for food to pass through the stomach and small intestine varies within very wide limits, depending on the kind and quantity of the food, the amount of liquids ingested with it, the degree of peristaltic activity, and other modifying factors. According to Howell,⁵ a series of observations made by means of a cecal fistula demonstrated that food began to appear at the ileocecal valve in from two to five and one-quarter hours after eating and continued to pass this point for from nine to twenty-three hours. Entering the colon still

⁵ American Textbook of Physiology, vol. i, p. 314.

in fluid form, but greatly reduced in amount by reason of the action of the absorbents, the watery constituents are here taken up and the refuse material is evacuated on the average some twelve hours later.

The sigmoid portion of the colon and the rectum constitute the normal receptacles for the storage of the fecal matter. The teaching that the rectum is always empty except during and immediately preceding the act of defecation is certainly not true within the writer's experience. On the contrary, the rule is that it always contains more or less feces except, perhaps, for a relatively brief period following the evacuation of stools of firm consistence. The old idea of reverse peristalsis advanced by O'Bierne, to account for the supposedly normal state of emptiness of the rectum, at the present time has few advocates and bids fair soon to become, as of right it should be, obsolete.

But while the rectum usually contains a certain amount of fecal matter, the bulk of it under normal conditions is retained in the sigmoid, which, by reason of its length, dependent position, and mobility, and the narrowing of its caliber at the distal end, is peculiarly well fitted to act as a fecal storehouse. Like the other portions of the large intestine, both the sigmoid and rectum are provided with an absorbent system (the crypts of Lieberkühn), so that the longer the fecal matter remains in them the firmer in consistence it becomes from the abstraction of its watery constituents.

The act of defecation is a complicated process. As the sigmoid loop becomes filled with feces it rises out of the pelvis, at the same time assuming a more or less vertical position so as to present its long axis in approximate line with that of the rectum. When in response to the combined actions of peristalsis and gravity the feces pass into the rectum, their descent is retarded and regulated partly by the curves of the organ, but more especially by the rectal valves which project from alternate sides into its lumen. The desire to stool is recognized, not, as a prominent author states, as soon as the fecal mass enters the rectum, but only when it approaches and impinges upon the special tactile apparatus (sense-organ of Stroud) at the lower end of the movable rectum. If it were true that the mere presence of feces in the upper portion of the rectum were sufficient to arouse this desire, undoubtedly most people would be on the anxious seat during the greater portion of their lives.

Up to this point defecation is entirely involuntary. And the act may be completed by the involuntary mechanism, unless the mass to be expelled is too large and firm to be handled by peristalsis alone. In this event the efforts of the muscular walls of the gut are reinforced and supplemented by those of the accessory voluntary muscles; the diaphragm is depressed and fixed by a full inspiration and the powerful abdominal

muscles are called into action. The great force thus developed in "straining at stool" is exerted in the direction of least resistance, *i.e.*, toward the pelvis, and the small intestines are crowded down upon the rectum, compressing it strongly and driving its contents into and through the anal canal.

The part played by the anal canal in defecation is purely passive, except at the completion of the act, when, by the contraction of the voluntary muscles which enclose it, any remnant of feces is expelled and its walls again brought into close apposition. This is the only section of the intestinal tract which is always normally empty. Intolerant of the presence of any foreign substance, whether fecal or otherwise, its office in defecation seems to be largely that of a passageway, illustrating the familiar principle of mechanics that a small pipe on the end of a flexible tube facilitates the discharge.

While the function of the anal canal in defecation is largely passive, it (or, more properly speaking, its voluntary muscles) possesses another very active as well as very important function, namely, the power to control and postpone the act until the propitious moment arrives. This power, or at least its exercise, is one of the distinctive traits of man and is conspicuous among those which raise him above the level of the brute creation.

Much has been written by physiologists about the center in the lumbar region of the spinal cord, which presides over the external sphincter and, on occasions, inhibits its action to permit of defecation. While not wishing to deny a proposition which is so time-honored and supported by so many eminent authorities, the writer would express the opinion that such conception of the action of this muscle is both unnecessary and confusing. True, it must relax to allow the escape of feces, but no intricate and undemonstrable theory of nerve influence is necessary to account for this. As mentioned in discussing the anatomy of the sphincter, in its normal condition it maintains a passive but effective closure of the anus, which is to be accounted for rather by the shape of the muscle and the arrangement of its fibers than by any constant expenditure of nerve-force. The only inhibition required in the case is the inhibition of the voluntary action of the muscle, to accomplish which no special center is necessary here more than with reference to any other voluntary muscle. The relaxation which occurs during defecation seems to the writer fully explained by the mechanical pressure of the descending feces upon a structure which is only offering passive resistance, and possesses sufficient resilience, independent of any nerve influence, to regain its normal form and tone as soon as the pressure is removed. But, it is argued, injury to the lumbar enlargement of the cord results

in loss of control. In answer it may be said that this is true because control depends on the voluntary action of voluntary muscles which receive their nerve-supply from this spinal focus. Of course, an atonic, flaccid condition of the muscle-fibers results, but to no greater extent than in the case of other voluntary muscles under similar conditions, *i.e.*, paralysis. That even the passive resistance of the sphincter under such circumstances should ultimately be lost is not to be wondered at.

The above remarks have no reference to the spinal center or centers which govern peristalsis. This is a purely involuntary phenomenon throughout and, like other functions which have to do with the maintenance of organic life, is regulated by a nerve mechanism which is entirely independent of volition, and of the workings of which we in reality know very little.

Two additional functions are possessed by the rectum, which call for separate mention, namely, secretion and absorption. The *secretory* apparatus consists of numerous goblet cells imbedded in the mucosa, which supply a thick, glairy mucus designed for lubrication. The cells are stimulated to activity by the irritation of the bowel contents. When the contents are dry and harsh the stimulation is relatively greater and the supply of mucus is consequently more abundant. Thus, in an important way, the passage of such feces is facilitated.

Absorption.—The power of absorption possessed by the rectum has already been alluded to. In addition to the abstraction of water from the feces, this function is often made use of for the administration of nourishment and medication when for any reason the stomach is out of commission. Life is capable of being sustained for long periods by the judicious employment of rectal alimentation, and patients are often tided over postoperative crises by hot salines and stimulants administered in this way. This absorptive power of the rectum is utilized for the administration of medicines, certain drugs seeming to operate more speedily when administered by this route than when introduced into the stomach. Among such drugs, strychnine, belladonna, and cocaine are notable examples.

CHAPTER II.

General Diagnosis; Symptomatology, Examination, Instruments, etc.

IN a general way it is true of all diseases that correct diagnosis is the only key to successful treatment. But the statement applies with especial and peculiar force to diseases of the rectum. Subjective symptoms are not to be relied upon for the reason that the same symptom-group may characterize lesions of widely different nature and significance. The laity knows little of the affections of this part except the word "piles"; and this ever-ready diagnosis, arrived at by the patient himself or suggested by some sympathetic friend, is usually glibly announced at the first consultation. Yet, so far as can be told from the symptoms in the average case, the trouble may as well be cancer as hemorrhoids. The statements of a patient are often of value and always entitled to a respectful hearing; but the question of diagnosis is one for the physician alone to determine. It cannot be too strongly emphasized that the physician who is "too busy" or whose training and equipment are insufficient to properly examine a patient has no moral right to prescribe. There may be some excuse for a failure to diagnose correctly, but there is not and can not be adequate excuse for failure to make the most thorough examination possible before instituting treatment.

There is nothing peculiarly difficult or obscure about the diagnosis of rectal diseases. On the contrary, if one will only insist on seeing what can be seen, feeling what can be felt, and making intelligent use of his other God-given faculties, they may be diagnosed with a readiness and accuracy which are often surprising. The point to be impressed is the absolute necessity of making a physical examination in every case if the welfare of the patients who confide their health and lives to our keeping is to be safeguarded. True, a certain amount of repugnance naturally attaches to manipulations of the rectum. But the fastidiousness which manifests itself in overnicety has no proper place in medicine, and the genuineness of the refinement which begets it is always questionable. In the combat with disease and death the conscientious physician who recognizes the sacred obligations of his calling considers nothing but the interests of the patients committed to his charge. The fruits of slipshod methods in the diagnosis of rectal disease, as of those of other organs, are preventable suffering, prolonged invalidism, and even the sacrifice of life.

SYMPTOMATOLOGY.

While the symptoms alone are never sufficient for diagnosis, they are always suggestive and should invariably be elicited and duly weighed. As a rule, the patient should be encouraged to describe his trouble in his own words, the information thus acquired being supplemented by a few well-directed questions expressed in simple language. In this way the embarrassment nearly always incident to first interviews may be greatly lessened. The family and personal histories should also be obtained in advance of the examination, as much light will thus often be thrown upon the case and special lines of investigation indicated.

Each individual case should be studied and diagnosed upon its merits, the fact being constantly kept in mind that a patient as well as a rectum is to be dealt with. And always the attitude of the surgeon should be patient and sympathetic. However accustomed he may be to this class of work, to the victim a rectal disease is a matter of special and deep concern, and usually altogether unique in some respects.

A great variety of symptoms may be produced by anorectal disease. It would be profitless to enumerate all of them; but the following are so characteristic and important as aids in diagnosis as to merit separate consideration: (1) pain, (2) hemorrhage, (3) protrusion, (4) perverted function, (5) tenesmus, (6) pathologic discharge, (7) itching, (8) shape of feces, (9) odor of discharges, (10) emaciation and cachexia, (11) sepsis and toxemia, (12) nervousness and irritability.

1. **Pain.**—This is undoubtedly the most frequent symptom met with, and, from the patient's standpoint, certainly the most important. The facts to be ascertained are: the character of the pain, whether acute and lancinating, dull and achy, or throbbing; the location, whether confined to a definite point, general, or reflected; the time of its occurrence, whether constant or, if intermittent, what relation it bears to the act of defecation, and the duration of each attack. How long the pain has been a feature of the case, when and how it began and whether it has undergone any change in character or intensity, are also points of significance to be elucidated by inquiry.

The class of lesions especially characterized by pain are those of the anal canal, particularly the lower portion, of which fissure is the conspicuous type. Both internal and external hemorrhoids when inflamed are acutely painful, as are also inflammatory lesions involving the perianal region.

Uncomplicated lesions of the movable rectum, as a class, do not present pain as a prominent symptom,—a fact to be easily understood by recalling the nerve-supply of this portion of the organ. They do,

however, give rise to heat, weight, and bearing-down sensations in the pelvis, which are often the sources of great discomfort to the patient. They are also frequently accompanied by reflex manifestations such as irritable bladder, so-called neuralgia of the uterus and its adnexa, aching over the sacral region, flatulent colic from digestive derangement, etc.

2. Hemorrhage.—This also is a very frequent symptom. The kind of blood lost, whether arterial or venous; the quantity; the relation of the symptom to defecation, whether it occurs only at stool or independently of the act; if associated with the functional activity of the rectum, whether it precedes, accompanies, or follows the fecal discharge; and the period of time covered by such losses, are the chief items upon which information is to be sought. The appearance of the patient is often an index to the importance of this symptom, profound anemia not infrequently being observed as the result of it.

The lesions most frequently characterized by this symptom are internal hemorrhoids, fissure, ulcerations, traumatisms, and carcinoma. Where the first-named cause is operative the hemorrhage is usually considerable in amount and follows the stool. In malignant disease also the quantity of blood lost may be large and, when the lesion is located high up, may be voided in the form of clots, independent of the passage of fecal matter, or mixed with it. The hemorrhage from other causes is generally insignificant in amount, the blood appearing as a streak or smear on the outside of the fecal mass.

It must not be forgotten, in estimating the importance of this symptom, that blood may be discharged from the rectum which has been swallowed or derived from a lesion in the stomach or upper portion of the intestinal tract. In such cases it is generally much darker in color and more or less disintegrated from the action of the digestive fluids, and in addition is incorporated with the feces in the form of a homogeneous mixture.

3. Protrusion.—With reference to this symptom we wish to know how long it has been in evidence; its relation to defecation, whether it occurs only at stool or at other times also; and whether the protruded mass recedes spontaneously, or has to be forcibly replaced.

The most noteworthy affections giving rise to this symptom, named in the order of their frequency, are internal hemorrhoids, prolapsus, and pedunculated neoplasms.

4. Perverted Function.—Either costiveness or diarrhea may be produced by rectal disease. The former symptom, costiveness, is chiefly found associated with painful lesions of the anal canal, and results from voluntary postponement of the act of defecation. The latter, diarrhea, is usually a reflex manifestation of a lesion located in the movable

rectum. A spurious form of diarrhea, in which the material evacuated consists of pathologic elements instead of fecal matter, is frequently met with; but true diarrhea, restricting the term to its proper meaning, must be considered a rather rare symptom of rectal disease.

5. **Tenesmus** always points to irritation or inflammation of the rectal mucosa. It may be due to a variety of causes, such as fecal impaction, pressure from a retrodisplaced uterus or pelvic neoplasm, ulceration, stricture, the presence of irritating discharges, etc.

While in itself not to be classed as real pain, straining at stool results in great discomfort and must be considered among the serious symptoms of rectal disease.

6. **Pathologic Discharge.**—Mucus, pus, and blood are the elements of which pathologic discharges are composed. Each of these may be met with separately or mixed in any proportion with either or both of the others.

Mucus in abnormal quantity is the result of overactivity of the mucus-secreting glands due to irritation or inflammation. It is the most common of the pathologic discharges, occurring as a symptom of proctitis and proctocolitis of practically all kinds and degrees. Sufficient irritation may also be produced by well-developed internal hemorrhoids, by the presence of thread-worms, or hard, dry feces in the rectum, and by pressure upon the organ from without, to result in this symptom.

Pus in unmixed form usually means that an abscess has opened into the bowel. Ordinarily it occurs admixed with mucus, or mucus and blood. It is always to be regarded as a symptom of more or less serious import.

Mucopus always unmistakably indicates the existence of an ulcerated or granulating surface, the location of which can only be determined by physical examination. It is observed, practically without exception, in those lesions which are characterized by solution of continuity of the mucosa, such as the several forms of ulceration, stricture, carcinoma, etc.

Blood.—The significance of discharge of pure blood has already been pointed out. In addition, discharges consisting of mucus, pus, and mucopus often contain blood varying in amount from barely enough to tinge them to a considerable proportion of the whole. Explanation of the presence of the blood element in such discharges is self-evident.

One other special type of pathologic discharge should be mentioned, namely, that which is met with in villous papilloma. This is a colorless, viscid mucus, and is chiefly notable for its great abundance. It is frequently mixed with blood in considerable amount. Its excessive quantity is considered by many as sufficiently distinctive to warrant a diagnosis of this lesion.

Whatever the composition of the discharges, they occur most frequently in the early morning, producing a spurious "morning diarrhea." This is accounted for by the accumulation which takes place overnight while the patient is at rest. The number of discharges in twenty-four hours may be as high as fifty, or even more.

7. **Itching.**—This symptom is referred to the portion of the anal canal within the grasp of the external sphincter, or to the perianal region. In a large proportion of cases it is due to some one or more of the pathologic discharges above described, though the patient usually speaks of it as "itching piles." Fissure is perhaps the one lesion with which it is most frequently associated, continuous discharge from the raw surface leading to maceration of the tissues and consequent pruritus. Most of the skin diseases found in the perianal region are also characterized by this symptom.

In addition it must not be forgotten that itching in this region is frequently met with as a reflex symptom in diseases of other pelvic organs, and in some cases must be regarded as a local expression of certain constitutional diseases, such as diabetes mellitus, rheumatism, gout, and chronic nephritis.

Acrid discharge from the vagina is a special cause of pruritus and in females of uncleanly habits.

8. The **shape of the stools** is thought by some writers to be of special value in the diagnosis of stricture, narrow, flattened fecal evacuations being considered pathognomonic of this lesion. Certainly such stools may result when the stricture is located in the *anal canal*; but according to the author's observation a spasmodic external sphincter is more often the cause of them. Postoperative cicatrization and pressure upon the distal extremity of the rectum from without may also account for this symptom in certain cases.

An associate symptom of value in conjunction with the ribbon-shaped stools is the *difficult defecation* which the obstructions above mentioned give rise to. This is sometimes so great that the strongest purgatives require to be supplemented by prolonged and violent muscular effort in order to secure an evacuation.

9. **Odor.**—The odor of certain discharges may be quite characteristically offensive, notably those of carcinoma, amebic dysentery, perianal condylomata, and freshly opened or ruptured perirectal abscess. These, like other odors, do not permit of accurate description, but once recognized are likely to be remembered.

10. **Emaciation and cachexia** are of value as symptoms, not in determining the presence of disease, but in estimating its gravity. When the fact of a rectal pathology has been established by other

symptoms, it is of great importance to ascertain to what extent the patient's general health has suffered,—how much he has lost in weight and when such loss began, whether he was previously robust and healthy in appearance, etc.

Emaciation and cachexia are most often met with in carcinoma and localized tuberculosis; but they do not warrant the conclusion that one or the other of these diseases must be present. It cannot be too strongly emphasized in this connection that any rectal disease which is characterized by a chronic, exhausting discharge, with its attendant digestive disturbance, autoinfection, pain, broken rest, etc., will sooner or later result in profound constitutional disturbance of which loss of weight and the so-called cachexias are merely expressions.

11. Sepsis and Toxemia.—Strictly speaking, sepsis is encountered only in those diseases of which suppuration is the salient feature, such as large perirectal abscesses. But a toxemia very similar to true sepsis is not infrequently observed in cases of ulceration, stricture, and malignant disease, as the result of absorption of the products of pathogenic organisms and other noxious material, through the lymph- and blood-vessels opened up by the disease process. The cachectic appearance referred to under the previous heading is undoubtedly, in part at least, often to be explained in this way.

12. Nervousness and irritability, while strictly speaking secondary phenomena, are so constantly present that they are entitled to a word of separate mention. A patient with a rectal disease is almost without exception a nervous patient. So pronounced is this characteristic in some cases that it becomes the chief burden of complaint. Pain, broken rest, digestive disturbances, toxemia, etc., readily suggest themselves in explanation of these phenomena. The apprehension which the average patient feels at disease of an organ which he cannot personally investigate, and the importance which he recognizes of maintaining the functional activity of that organ even at the cost of actual suffering, are additional explanatory factors.

Such, in brief, are the various subjective phenomena of anorectal disease. When these have been fully and systematically elicited and the patient's family and personal histories carefully inquired into, it remains to complete the investigation with a thorough, painstaking physical examination. So far the information obtained is merely preliminary and preparatory. Important though the symptoms are as aids in diagnosis, they must be regarded as suggestive only. At the risk of appearing dogmatic the author would again emphasize the vital necessity of physical examination in every case. The patient whose treatment is undertaken

upon any other basis not only fails to receive justice, but is made the victim of gross injustice, oftentimes irremediable in its ultimate results.

EXAMINATION.

Preparation of the Patient.—As a rule, the rectum and sigmoid should be emptied by a copious enema of warm soapsuds or boric acid solution, preferably administered an hour previous to the examination, so that any retained fluid may have time to be absorbed. When the exigencies of the case render the delay necessary for this purpose



Fig. 12.—Simple irrigation apparatus.



Fig. 13.—Office commode.

undesirable for any reason, the enema may be given in the office and the examination immediately proceeded with, any fluid remaining being removed by siphonage. An irrigation apparatus (Fig. 12) with the container placed about five feet above the floor, and capable of being raised or lowered at pleasure, constitutes a desirable outfit, though an ordinary fountain syringe serves every purpose. In the absence of an easily accessible toilet-room a well-designed commode (Fig. 13) should always form part of the office equipment. In exceptional cases it is desirable to make a preliminary examination in advance of the cleansing enema in order that the character and amount of all bowel contents may be determined. When the enema is taken immediately preceding the examination the patient should be cautioned not to replace any protrusion which may result from its expulsion, as mere inspection of the parts under such circumstances may be of great aid in arriving at a diagnosis.

All articles of wearing apparel which in any degree constrict the waist should be loosened or removed, as otherwise the abdominal viscera may be so crowded down upon the rectum as to interfere with the examination. A trained attendant should be provided to assist female patients before and after the examination, the surgeon being summoned when the patient is arranged upon the table and retiring when the

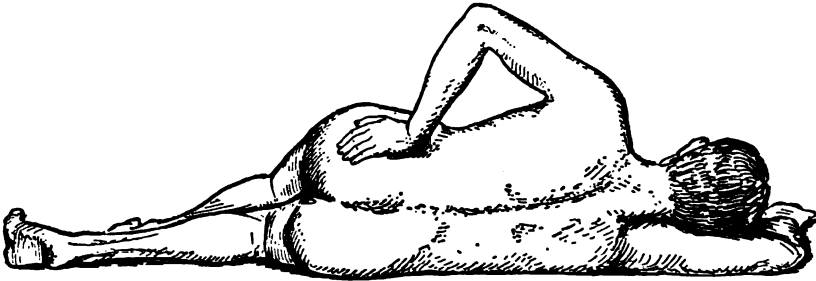


Fig. 14.—Right lateral position.

examination is made. Feminine modesty will be further safeguarded if the office is so arranged as to afford a separate exit from the consultation-room.

Position.—Several positions are eligible for rectal examinations, each of which possesses one or more points of special advantage. As a rule, *the right or left lateral position* will prove the most readily available for ordinary purposes. These positions are attended with a

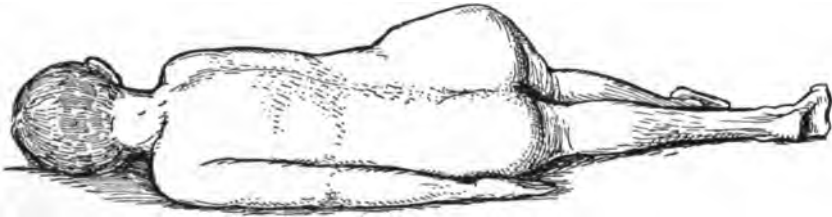


Fig. 15.—Semiprone position of Sims.

minimum of exposure and have the further advantage of rendering it possible for the patient to assist in the examination by supporting and retracting the uppermost buttock. The hips should be drawn to the edge of the table and the thighs and legs strongly flexed so as to present the anal region as prominently as possible (Figs. 14 and 15).

The *semiprone position* of Sims is of special value in the case of female patients, where a high view of the rectum is desired. It requires

no greater exposure than the lateral position, and, when the pelvis is elevated upon a pillow, often permits a satisfactory view of both the upper rectum and the sigmoid to be obtained.

The *lithotomy position* is chiefly employed in operations, in which it possesses decided advantages. It is also particularly useful in the

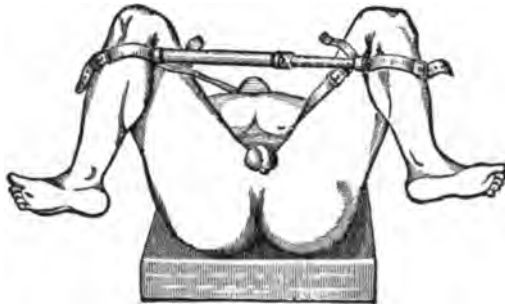


Fig. 16.—Lithotomy with leg holders.

case of obese patients in whom the anus is deeply placed and difficult of access. On account of the embarrassment incident to this position and the apparatus or additional attendants necessary to maintain it, it is



Fig. 17.—Brick's modified Clover crutch.

usually well to reserve it for those cases in which a general anesthesia is to be administered (Figs. 16 and 17).

The Knee-Chest Posture.—The special field of usefulness of this rather awkward and always, to lady patients, embarrassing position is in examination by sight of the higher portion of the bowel, and in intrarectal operations (Figs. 18 and 19). The principle upon which its

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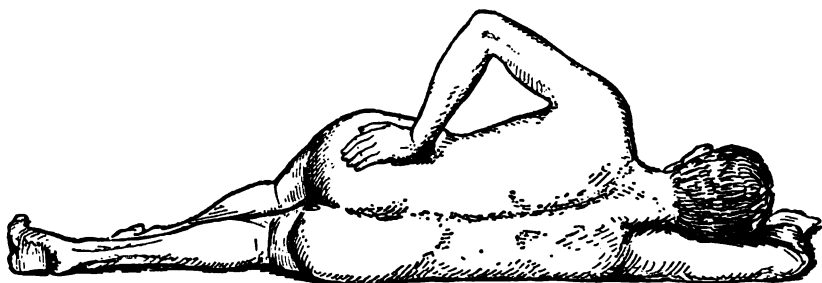


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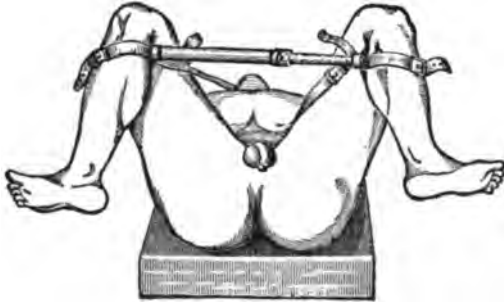


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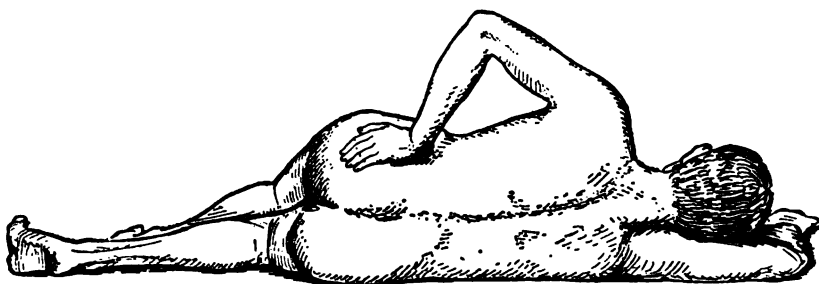


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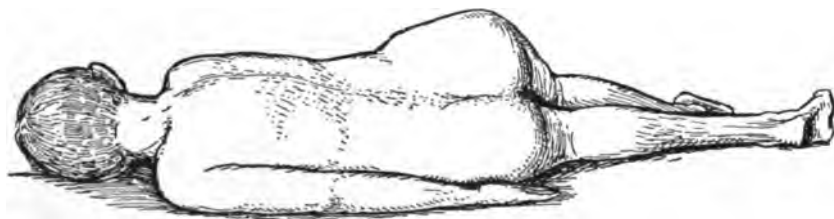


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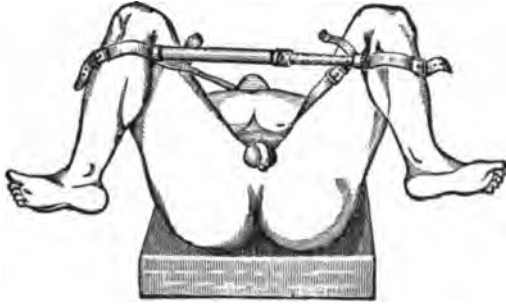


Fig. 16.—Lithotomy with leg holders.

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Fig. 17.—Brick's modified Clover crutch.

usually well to reserve it for those cases in which a general anesthesia is to be administered (Figs. 16 and 17).

The Knee-Chest Posture.—The special field of usefulness of this rather awkward and always, to lady patients, embarrassing position is in examination by sight of the higher portion of the bowel, and in intrarectal operations (Figs. 18 and 19). The principle upon which its

effectiveness depends is atmospheric inflation and, unless properly employed, its purpose is easily thwarted. The point to be emphasized is expressed in the designation *knee-chest*. The knee-elbow position has no advantage over those already alluded to, and is more than likely to be wholly ineffective when atmospheric distention is aimed at. When the proper position is assumed the movable viscera are displaced downward out of the pelvis by gravity and the sigmoid brought more nearly into line with the rectum. On opening the anus with an instrument, or even with



Fig. 18.—Incorrect knee-chest position.

the fingers, air rushes in and distends the organ, rendering it possible by the use of modern instruments to expose the entire interior for a considerable distance to direct inspection.

For the purpose of ordinary office examination and treatment the average patient is quite capable of maintaining this position for the requisite length of time. The patient first kneels on the table or chair adjusted to form a flat surface, then brings his chest down into contact with it, his head turned to one side and resting upon a small pillow. The position is not to be considered correct until the thighs are made to assume a perpendicular direction, when the trunk will present a sharp

downward inclined plane. Though far from comfortable, such position can usually be retained for several minutes without great inconvenience.

The inverted position is strongly recommended by Hanes, of Louisville. This is secured by having the patient lean down off the table or chair so that the entire trunk is dependent and only the lower extremities remain supported in the horizontal position. Two low chairs or stools with cushions may be utilized to support the shoulders, or, if the table is of proper height, the arms folded over the head may be



Fig. 19.—Correct knee-chest position.

supported by a pillow on the floor. No special advantage is gained by this awkward posture, and the average patient is generally reluctant to assume it. The special table designed by Hanes (Figs. 20 and 21) greatly simplifies and renders it less objectionable in every way.

When a prolonged operation or examination is to be made, or a general anesthetic administered, it may be necessary to provide some form of artificial support. For this purpose the ingenious modification of the Yale chair devised by Martin, of Washington, is admirable (Fig. 22). By means of this chair the patient may be quickly placed in an exaggerated knee-chest posture and retained so with a minimum of discomfort and embarrassment for an indefinite time. To compass the same

end Kelly, of Baltimore, has designed an apparatus consisting of uprights attached to either side of the table supporting a complicated system of straps. A portable table carrying out the principle of the Martin chair has also been devised by Pennington, of Chicago.

An additional position sometimes resorted to for special reasons in rectal examinations is obtained by having the patient assume a *stooping* or *squatting posture*, a digital exploration being instituted during a bearing-down effort. Little or no real advantage is to be gained from this method and, for obvious reasons, it is seldom resorted to.



Fig. 20.—Hanes's chair. Patient in position ready to be inverted.

Table, Light, etc.—No special pattern of table or chair is essential for rectal examinations. The usual gynecological table or operating chair with which every physician's office is equipped, properly used, will allow the patient to be placed in any position desired. The Martin modification of the Yale chair is, however, to be preferred, in that, while serving for all ordinary purposes, it permits the position necessary for high examinations to be secured easily and quickly, and maintained for any reasonable length of time without undue discomfort or fatigue. It is not the peculiar type of the table or chair, but the use made of it, which determines its value.

The question of **light** is one of more serious import. A great deal of time, thought, and ingenuity have been expended in devising special

apparatus for illuminating the bowel, the favorite at the present time being the small electric lamp adjusted to the proctoscope. This is quite serviceable when in good working order, but, unfortunately, is of rather delicate construction and apt to be out of repair when most needed. Reflected light is probably the method of illumination most often employed and most generally useful. Gas and electricity are the forms of artificial light most commonly available, both of which require to be concentrated as well as reflected to give satisfactory results. Without specifying the several objections which might be urged to these agents,



Fig. 21.—Hanes's chair. Patient inverted.

the author will state that he is personally accustomed to rely upon daylight reflected by means of a four-inch head mirror (Fig. 23), and believes that it possesses some advantage over all other forms for regular use. Among such advantages may be mentioned the facts that it eliminates all cumbersome apparatus, is universally available, and gives a more natural appearance to the parts than any form of artificial illumination. The only requisite in the case is a window giving an unobstructed sky exposure, and the best results are obtained when all light from other sources is shut off during the examination (Fig. 24).

But after all, perhaps, the chief desideratum in this connection is that some one form of light be adopted and employed exclusively, at least until facility in its use and familiarity with its effects are acquired.

While nothing should be sacrificed to haste, examinations should always be conducted as expeditiously as possible. To this end instruments, lubricant, cotton, solutions for local treatment, etc., should be conveniently arranged and in easy reach.

Provisions should also be made for the due observance of antiseptic precautions in office work. For this purpose a sterilizer, which in the absence of gas may be arranged for burning alcohol, should form part of the office equipment (Fig. 25). It is likewise important that a couch be provided, as not infrequently it is both desirable and necessary that a patient be allowed to lie down for a few minutes before leaving the office.



Fig. 22.—Martin's chair.

The selection of office furniture and apparatus and the arrangement of same are matters to be determined by individual taste. It should be borne in mind, however, that thought and money expended on such details form a good investment. First impressions are lasting, here as elsewhere. A well-equipped office, showing careful attention to detail in its arrangement, goes far with the average patient toward establishing that confidence which is so desirable from every point of view.

In examination of the rectum and anus four methods are employed: (1) inspection; (2) palpation; (3) digital exploration; (4) the use of instruments. In some instances the two first-named methods, in conjunction with the history and symptoms, will prove sufficient. But, inasmuch as a superficial lesion may not be the only pathology in the

case, it is always advisable, when possible, to follow inspection and palpation with a digital, and usually, also, with an instrumental, examination.

Inspection.—The external appearances alone are often quite distinctive. As familiarity with this class of diseases is gained from actual



Fig. 23.—Head mirror.

experience, it will be found that in a considerable proportion of cases a fairly accurate idea of the trouble to be dealt with can be formed by simple inspection of the anus and circumanal region. The points to be noted are: the general conformation of the parts; the size and condition of the anal aperture, whether normal, contracted, or relaxed and



Fig. 24.—Electric head light and reflector.

patulous; the presence or absence of protrusion, and, when present, its size, shape and other characteristics; the nature and source of any undue moisture; whether there are external hemorrhoids or other new growths, and the distinctive features of same. The presence or absence of the normal pigment in the surrounding integument should also be carefully observed, and whether there are evidences of skin diseases or lesions

which might result from scratching. The external opening of fistulas, swellings, or other conditions which give rise to an asymmetrical appearance of the two sides, cicatrices,—in short, any and every abnormality,—should be painstakingly noted and further investigation conducted in the light of such findings.

By placing a thumb on either side of the anus and gently drawing it open while the patient makes a bearing-down effort, a considerable portion of the anal canal may usually be exposed to view. In this way a fissure may be readily seen, and often, also, internal hemorrhoids, the internal opening of fistulas, and other lesions.

Palpation is a valuable adjunct of the examination and may be readily practised in conjunction with the inspection. In some cases it

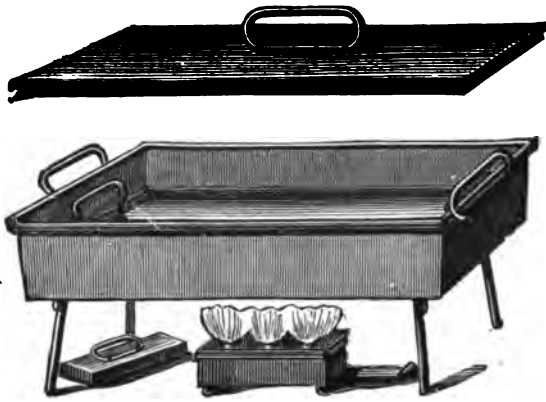


Fig. 25.—Office sterilizer.

will furnish information which can be obtained in no other way so well, notably as to the state of the external sphincter, whether hypertrophied, spasmodic, and irritable, or unduly weak and relaxed. The tract of a fistula may also often be traced by palpation and its direction and extent thus ascertained, and the nature of any swelling present, whether painful, fluctuating, or indurated, and its relation to the bowel determined. Of course, this method should be employed with the utmost gentleness, as the infliction of pain at this stage is likely to interfere seriously with the completion of the examination.

Digital Exploration.—The educated finger constitutes the most valuable and trustworthy agent which can be employed in rectal examinations. To be of the greatest value in the diagnosis of disease, however, perfect familiarity with the parts in health is obviously essential. For this reason the author would strongly urge that those who contemplate taking up this line of work should utilize every opportunity

to make digital explorations of the normal rectum. The knowledge to be gained in this way is not limited to the rectum and its diseases, but includes the structures forming the boundaries of the pelvis, the several genitourinary organs in both sexes, and other pelvic contents, normal and abnormal.

The index finger should be well anointed with vaselin or other consistent lubricant and gently introduced, bearing in mind that the external sphincter is apt to resent hasty or rough usage by spasmodic contraction, which in the presence of a painful lesion may cause great suffering. For the first two inches (the anal canal) the finger should be entered in a direction forward and upward as though the umbilicus were the objective point, then turned backward into the pouch of the rectum. A mistake very frequently made is that of passing the finger at once to its full extent. Probably fifty per cent. of the diseases of this organ are located in the terminal two inches, which should therefore be first carefully investigated. As the finger enters, the condition of the external sphincter should be noted, whether normal in its resistance, relaxed, spasmodic as from an acute lesion, or hypertrophied as the result of overactivity kept up by long-continued irritation. The circular depression between the two sphincters should next be examined with special care, as it is here that the internal openings of fistulas are most frequently found. Next the internal sphincter area should receive attention, hypertrophied papillæ and abnormal conditions of the anal pockets and valves being noted. It is at this site that internal hemorrhoids develop, but it must be remembered that they cannot often be detected by touch even when known to exist, except in certain cases of long standing where, from constant irritation, the vascular elements of the pile tumors have been partially replaced by connective tissue, thus giving them firmness and density.

Passing the finger into the pouch of the rectum every portion of the bowel wall should be in turn examined. Since the palmar surface, or pulp, of the finger contains the tactile organs, the examination will be rendered easier for both parties concerned by employing the finger first of the right hand and then of the left, or *vice versâ*, depending on the position of the patient. The height to which such exploration may be effectively carried varies with the length of the examining finger, the rigidity of the pelvic floor, the conformation of the external parts, and the amount of force employed. By making considerable pressure an average of probably three inches of the movable rectum may be thus satisfactorily investigated.

The list of pathologic conditions which may be accurately determined by the educated sense of touch includes the larger portion of those met

with in the rectal ampulla. Stricture, impaction, neoplasms, invagination, many forms of ulceration, and even uncomplicated proctitis of the dry atrophic type, may be readily and quickly diagnosed by this method alone. But the examination should not be confined to the rectum. In many cases valuable information may be gained in this way as to the condition of other pelvic organs, *e.g.*, the prostate gland, seminal vesicles, and deep urethra in the male, and the uterus and oftentimes the tubes and ovaries

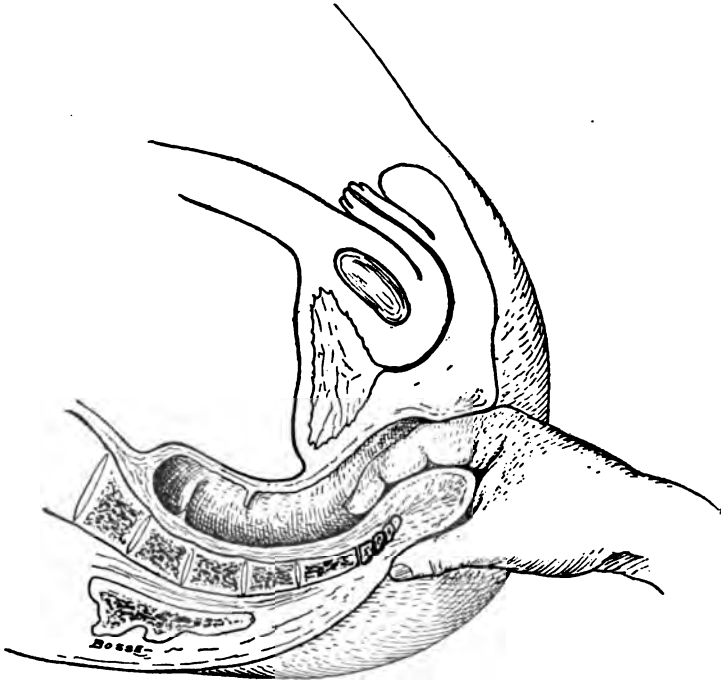


Fig. 26.—Examining coccyx, finger internal and thumb external.

in the female. Even though sufficient pathology may be found in the rectum itself to account for the symptoms, little additional time is required to extend the examination to these organs, and it is the part of wisdom to do so in all cases.

Before withdrawing the finger the coccyx should always be carefully examined. This is best done by grasping it between the finger and the thumb of the same hand placed externally, any faulty position, undue sensitiveness, or abnormal mobility being thus easily determined (Fig. 26).

In female patients eversion of the lower end of the rectum by means of two fingers introduced into the vagina is recommended as a diagnostic expedient. In exceptional cases the method may be of some value; but

inasmuch as only a small portion of the anterior wall of the bowel can be thus exposed, its field of usefulness is rather limited. For self-evident reasons the method is only to be resorted to in multiparous women with relaxed perineal floors (Fig. 27).

In this connection it is proper to refer to *introduction of the entire hand* as a diagnostic measure. Formerly this procedure was frequently resorted to and highly extolled by some surgeons, and even at the present

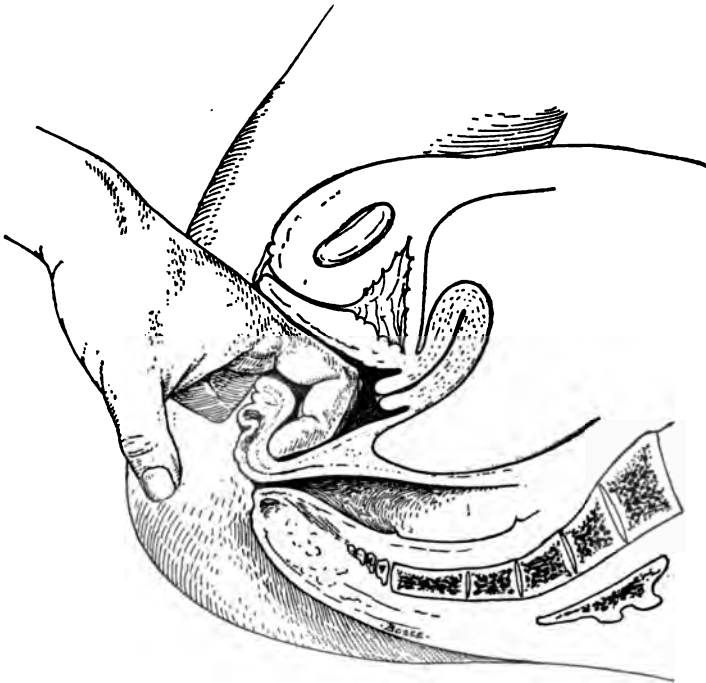


Fig. 27.—Eversion anterior rectal wall through vagina.

time is not without its advocates. It is mentioned here for the single purpose of unreservedly condemning it. The special advantage claimed for the method is the means afforded by it of diagnosing disease of the upper rectum and sigmoid. But when we reflect that these portions of the bowel are more or less completely invested by the comparatively inelastic peritoneum, it at once becomes apparent that the passage of the hand into them, even when in a state of health, must be attended by very positive danger,—a danger which is necessarily increased manifold by the presence of disease. Furthermore, no information is to be obtained by this method which may not be better and more intelligently obtained by the use of the perfectly safe modern methods for direct inspection

of the parts. Altogether, the author desires to express himself as being unable to conceive of any combination of circumstances which would justify the employment of this procedure for diagnosis. That it has been employed without permanent ill effects does not lessen the dangers involved, nor warrant resort to a measure which may be justly characterized as both barbarous and foolhardy.

INSTRUMENTS, ETC.

Instrumental Examination.—Up to a little more than one decade ago the intestinal tract above the distal five inches was a veritable "Darkest Africa." The many "new" and "improved" specula, bougies, etc., from time to time devised and described, serve as eloquent witnesses to the sore need formerly recognized by the workers in this field. Today such need is no longer felt. Modern instruments and methods of



Fig. 28.—Martin's speculum.

examination have rendered the rectum and sigmoid flexure as readily accessible to exploration by direct inspection as the vagina, pharynx, or bladder. The term "obscure" as applied to diagnosis at the present time has no place in the vocabulary of the well-equipped proctologist. With rare exceptions failure to locate with precision and correctly diagnose any rectal lesion means carelessness, incompetence, or inadequate equipment, one or all.

When the methods of examination previously described have been successively and carefully employed, it may or may not be necessary to resort to instrumental examination. When the lesion is located in the movable rectum it is always wise to do so, even though a positive diagnosis may have been made by the educated finger, for the reason that many details of information are to be gained by sight which the sense of touch, however acute, cannot reveal.

In the exceptional case it may seem best to vary the regular order by resorting at once to instrumental examination. But even in such event preliminary introduction of the finger is not to be omitted, as thereby the parts are lubricated and in a measure prepared for the instrument.

Specula and Bougies.—As diagnostic agents all varieties of specula and bougies are open to one simple criticism, namely, that they fail of the object intended. The best of the former, if such an expression is permissible with reference to contrivances uniformly bad, effect only partial exposure of the distal three inches of the organ, and that at the expense of great discomfort to the patient unless general anesthesia be employed. With respect to bougies, the shape and contour of the rectum

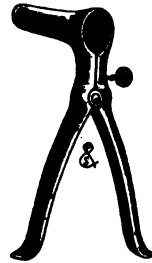


Fig. 29.—Gant's rectal speculum. Fig. 30.—Bodenhamer's rectal speculum.

are such that they are of doubtful value even in the hands of the most skilled, and their use is attended by an element of danger too positive to be ignored. Both specula and bougies, however, may be of considerable service in treatment. The conical, fenestrated speculum (Fig. 28), of which there are many patterns known by various names, is the most generally useful. When a lesion has been definitely located within two and one-half or three inches of the anus, it may be exposed for treatment by means of this instrument with little or no discomfort to the

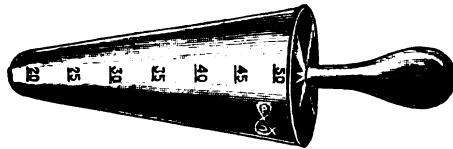


Fig. 31.—Kelly's sphincter dilator.

patient. A modification of the instrument devised by Tuttle is provided with a fenestrum on each side and is consequently an improvement on the old pattern.

Sims's wire speculum is perhaps the most popular and widely used of these instruments. The only advantage it possesses is in exposing a larger area of the bowel wall than other varieties, but, inasmuch as the blades must be opened before any views can be obtained, it possesses the disadvantage common to all hinged instruments, *i.e.*, the discomfort attending its use.

A rectal retractor (Figs. 34 and 35) may be described as a speculum possessing only a single blade. The ordinary Sims vaginal speculum may be made to serve every purpose, though it is much better adapted for rectal work when modified by replacing one end with a straight handle. Access to the lower portion of the rectum, particularly for operation, may be considerably facilitated by these instruments. It is obvious, however,

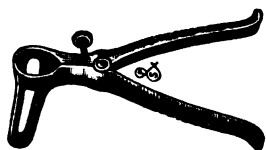


Fig. 32.—Sims's rectal speculum.



Fig. 33.—Cook's trivalve rectal speculum.

that their field of application is restricted to cases in which general anesthesia is employed.

A sufficiently accurate idea of the several other types of specula may be gained from the accompanying illustrations.

The only variety of bougies worthy of consideration is the Wales soft-rubber bougie (Fig. 36). This instrument is made in several

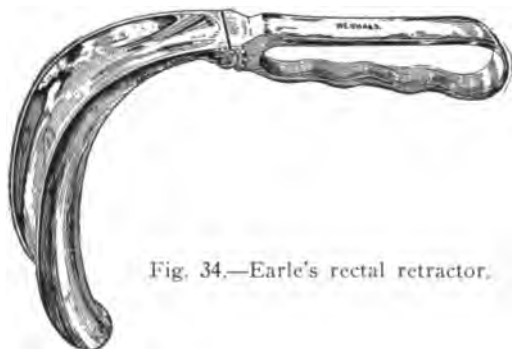


Fig. 34.—Earle's rectal retractor.

lengths and in sizes numbered from 1 to 12, the former being 0.8 centimeters (0.3 in.) in diameter, the latter 3 centimeters (1.2 in.). It is provided with a conical end, which terminates in an olivary or spherical tip, and has a central canal traversing it lengthwise. This is the least dangerous form of bougie, but is not to be recommended for indiscriminate use as a diagnostic agent, as in the hands of the careless or inexperienced it is capable of inflicting irreparable damage in certain diseased

conditions. It is a useful instrument for the dilatation of fibrous strictures of the movable rectum. When employed for such purpose, if the stenosis is beyond the reach of the finger, it should always be introduced under direct sight, *i.e.*, through the proctoscope. It also furnishes a convenient means for administering high enemata and, in inflammatory lesions of the upper rectum and sigmoid, for applying medicinal agents in fluid form directly to the part affected. For the last-

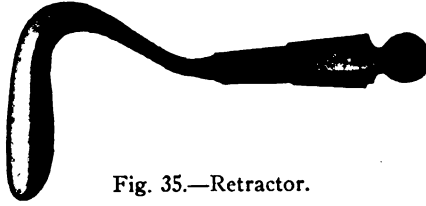


Fig. 35.—Retractor.

named purpose the preferable size is a No. 5, and its introduction is greatly facilitated by connecting the nozzle of a fountain syringe or irrigator with it and allowing an ounce or so of tepid water to flow into and distend the bowel as often as the tip becomes engaged. The smaller sizes are open to the same objection which applies to the ordinary soft-rubber rectal tube, namely, that when its introduction is attempted by the patient or average nurse, it is so flexible that it readily coils up in the rectal ampulla,—a fact which may easily be verified in the majority

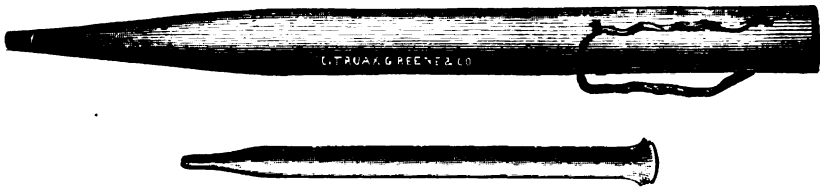


Fig. 36.—Wales's rectal bougies.

of cases by insertion of the finger. In cases of stricture it may be desirable to provide the patients with a bougie of suitable size for regular use. This should not be done, however, when an instrument of greater length than six inches is required.

As heretofore observed, bougies as a class are to be regarded as dangerous instruments. The rigid and semiflexible types formerly so highly lauded for the diagnosis of stricture have many times caused the death of patients from perforation of the gut-wall,—an accident by no means impossible of occurrence even with the Wales bougie, particularly

when the large sizes are used. The truth is that it is difficult to avoid a diagnosis of stricture when such means alone are relied upon. It is of the utmost importance to understand clearly that the proper function of bougies has to do with the treatment, not with diagnosis. In the one case they are of undeniable value; in the other they are both inefficient and unsafe.

Proctoscopes.—The possibilities of proctoscopy, in the diagnosis and treatment of diseased conditions of the lower bowel, are practically limitless. That this method is capable of revealing every detail of every portion of the rectum to direct inspection is a fact of almost revolutionary significance to the workers in this field. As a direct result the various anatomic features of the rectum have become as familiar as those of

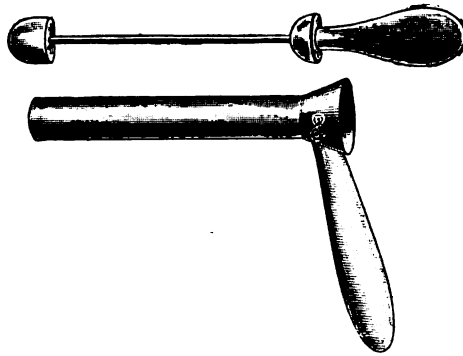


Fig. 37.—Kelly's proctoscope.

any organ in the body, and many mooted points in rectal pathology have been settled beyond the possibility of further controversy.

Tubular specula have been utilized in rectal examinations for many years. As described by their several inventors, the uniform method of employment of this type of instrument consisted in introducing it to its full extent with the patient in the lateral position and inspecting the limited area of mucous membrane which presented at the distal end while the instrument was being withdrawn. The only merit possessed by such instruments so used over the ordinary hinged speculum lies in the comparative freedom from pain of the former.

The principle of atmospheric inflation, which is the essential feature of modern proctoscopy, is likewise a very old one. More than half a century ago J. Marion Sims discovered its value in vaginal examinations and described a practical method for utilizing it. Credit for priority in the application of the principle to rectal examinations undoubtedly belongs to Van Buren, of New York, who first demonstrated it in 1871.

But not until the epoch-making work of Kelly, of Baltimore, in 1895, did the great value of the method obtain general recognition. Thus, while neither the invention of the tubular instrument nor the discovery of the principle of atmospheric inflation can be accredited to Kelly, to him beyond question belongs the distinction of first demonstrating their possibilities in rectal work, and so, in a very real sense, of originating modern proctoscopy. With an enthusiasm, excusable, perhaps, but not justified by the facts except possibly in the rarest instances, he claimed to be able to introduce a straight tube entirely through the sigmoid



Fig. 38.—T. C. Martin's proctoscope.

flexure and examine the descending colon by direct inspection. Such teaching is certainly unsafe. The length of the instrument required for this purpose would exceed twelve inches, and when introduced to its full extent would, as demonstrated by Abbott and verified by Tuttle,¹ in the average case reach quite to the diaphragm. The pain incident to such manipulation would be such as to necessitate general anesthesia, which is positively contradicted in this form of instrumentation, as the sensations of the patient are the surest warnings when the limits of safety are reached.

The objection above urged to the long tubes has reference to their use under normal conditions. In the presence of disease, for the diagnosis of which they are usually resorted to, it is evident that the objection applies with additional and especial emphasis. More than one

¹ Tuttle: Diseases of Anus, Rectum, and Pelvic Colon, p. 126.

instance has been reported of perforation of the bowel and death of the patient from this cause.

A satisfactory working set of the Kelly instruments consists of three tubes, two, four, and six inches in length respectively. It is well also to be provided with an eight-inch instrument (sigmoidoscope) to meet extraordinary requirements. As a rule, the six-inch instrument reaches well into the sigmoid flexure and leaves nothing to be desired in the majority of cases. All of these tubes have a uniform caliber of seven-eighths inch, but each length requires a separate obturator.

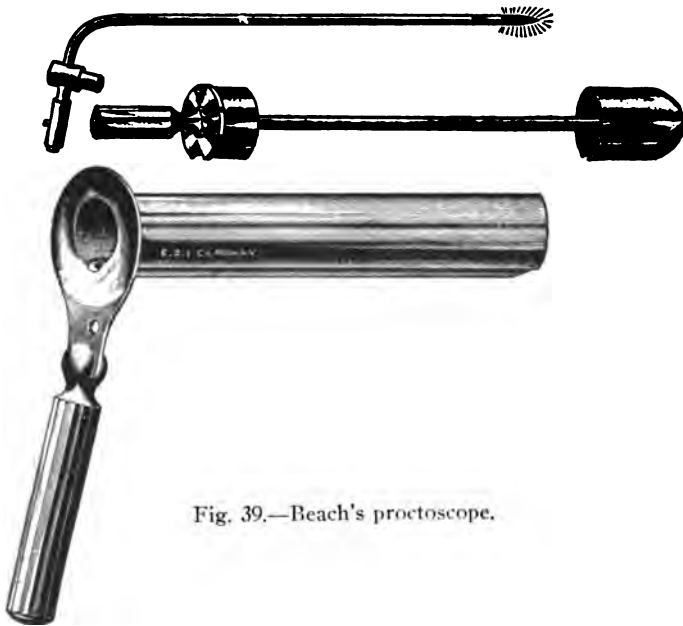


Fig. 39.—Beach's proctoscope.

The Martin proctoscope is to be considered an improvement upon the Kelly instrument, particularly as to the obturator. This is made of hard rubber, has a central canal which may be used for injecting medicinal solutions, and is so arranged that only one is required for an entire set of proctoscopes. It has the disadvantage, however, of being more difficult to sterilize, since the material will not permit of boiling. The proctoscope is made in two sizes, seven-eighth and one and one-quarter inch in diameter, the latter being especially useful in operative work.

Modifications of the proctoscope, each possessing more or less ingenuity and merit, have been devised by Pennington, Beach, Tuttle, Yeomans, and others. (See Figs. 39 to 41.) The claims of these modifications

to superiority are based on one or two special features, namely, (1) direct illumination of the parts by means of the small electric lamp located at the distal extremity of the tube, and (2) provision for artificially inflating the bowel by the use of hand-bulbs. The latter feature is common to each of the several forms mentioned, which in consequence are known as **pneumatic proctoscopes**. These instruments are all, to greater or less degree, complicated and cumbersome, and require a dexterity for their successful employment which is only to be acquired by much practice. The single advantage the author would concede them is the minor one of rendering it possible to effect inflation of the gut without resort to the knee-chest posture. As opposed to this point of advantage, at least two positive objections may be urged. In the first place, when the organ

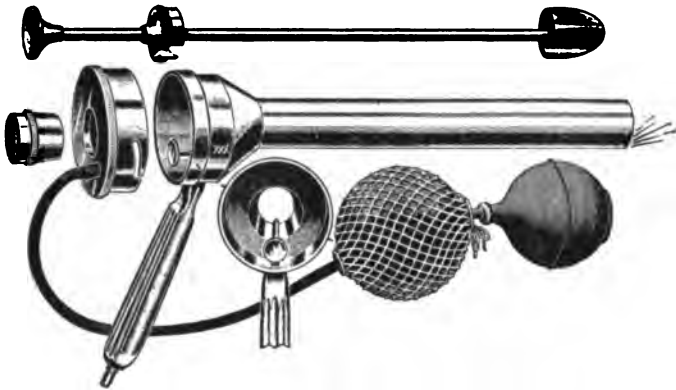


Fig. 40.—Pennington's proctoscope.

is in an approximately healthy condition it is wholly unnecessary; in the second place, when it is so diseased that inflation fails to take place spontaneously, the application of sufficient force to accomplish this end cannot be other than hazardous.

Referring now to the plain tubes, for the successful practice of proctoscopy there are just two essentials, namely, (1) proper posture of the patient, and (2) the use of reflected light. With regard to posture it must again be emphasized that nothing short of the knee-chest or some equivalent posture is to be relied upon, and even this will often fail unless the additional precaution is taken to remove all constriction from about the patient's waist. Concerning the light, it need only be further said that the important item in this connection is the employment of a good concave mirror to concentrate it upon the field to be explored.

Given the proper instruments, the proper posture, and the proper light, the successful practice of proctoscopy is still in large measure

dependent upon employment of the proper technique. Whether in health or disease, due care and gentleness are to be observed in the instrumentation, both in order to avoid inflicting pain, and to the end that the comfort of the patient may promote that condition of passive relaxation so necessary to satisfactory results. Properly performed, proctoscopy of the normal rectum is entirely painless; in disease, it is more nearly so than any other method of instrumental examination. It may here again be noted that it is of the utmost importance to keep constantly in mind the normal direction and curves of the bowel. Through the distal

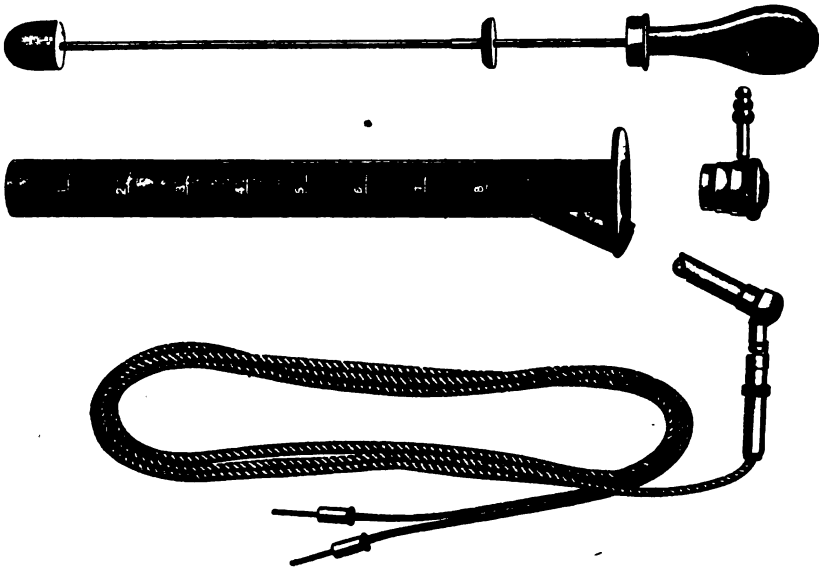


Fig. 41.—Yeomans's electric and pneumatic proctoscope.

two inches—the fixed rectum—the proctoscope should be passed directly toward the prostate gland, then turned abruptly backward or, rather, upward in the protoscopic posture, into the hollow of the sacrum, the concavity of which is to be closely followed for the next four inches.

Vaselin having been freely applied to the parts and the finger gently introduced so as to prepare the way, the well-lubricated proctoscope with the obturator in position is firmly pressed against the anus, the patient being requested at the same time to make a mild straining effort. Correctly handled, the instrument will usually pass in with surprising facility. As soon as the pouch of the rectum is entered the obturator should be withdrawn, when inflation will occur immediately and oftentimes audibly. The further passage of the instrument is to be effected under direct guidance of the eye, being so manipulated as to meet the

PLATE V.



Radiograph of rectum and sigmoid, filled with bismuth-buttermilk mixture.

varying topography and changes in direction of the gut. As a general thing it is well to employ first the proctoscope of medium length (three and one-half to four inches), since with it the entire rectum may easily be explored, the longer and shorter instruments being reserved for supplementary investigation when required, and for the treatment of such lesions as are rendered more accessible by them.

Other instruments which are necessary for use in conjunction with the proctoscope or specula are **dressing forceps, applicators, probes,**

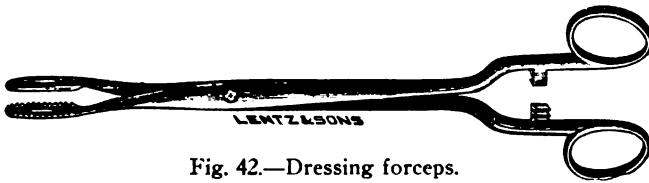


Fig. 42.—Dressing forceps.

curettes, etc. (Figs. 42 and 43). These should be of different lengths and arranged ready at hand so as to expedite the examination. A compressed-air apparatus for spraying the mucosa with medicated solutions is also an important adjunct to the equipment, though it may be replaced by the ordinary hand-atomizer.

Four other diagnostic aids which may be of the greatest value in obscure cases remain to be mentioned: the use of the X-rays, abdominal palpation, vaginal examination, and examination of the feces:—

Use of the X-rays.—The value of the X-rays as a means of diagnosis in certain cases can scarcely be overstated. This is particularly



Fig. 43.—C. F. Martin's probe-grooved director applicator.

true of pathologic conditions of the sigmoid flexure and colon. Often more information may be gained by a few minutes' study of a well-made radiograph than is possible by repeated physical examinations by other methods. Augulation, torsion, ptosis, malformation, diverticula, stricture, intussusception, etc., of the gut may not infrequently be recognized at a glance. When this method of examination is to be employed the only preparation necessary is to thoroughly cleanse the bowel with enemas and fill it with a suspension of bismuth subnitrate in a suitable fluid medium (*e.g.*, buttermilk). Two or more exposures at different angles should always be made so as to properly locate any abnormality which may be present. (See Plate V.)

Ordinarily two ounces of bismuth thoroughly mixed with a pint of the fluid, and the whole amount injected, will suffice for photographing the outlines of the rectum and entire sigmoid.

Abdominal Palpation.—A large proportion of rectal cases are marked by symptoms of digestive derangement; in fact, when the lesion is located above the anal canal, this may be considered the rule rather than the exception. Again, the appearance of the patient and the history of the case may point to malignant disease or other grave malady. In all such cases it is well to begin the examination with a careful exploration of the abdomen, outlining by palpation and percussion the position and condition of the colon and other viscera, and locating any areas of tenderness, or other abnormalities. Not infrequently it will prove of as much importance in reaching a correct diagnosis to know of the existence of a chronically inflamed appendix, a movable kidney, or a general splanchnoptosis as to determine the presence of pathology in the bowel itself. The suggestion is made to begin with the abdominal investigation in suspicious cases, for the reason that when inflation has occurred as the result of a rectal examination, the distention of the bowel is often such as to obscure the other abdominal organs and render their palpation difficult and uncertain.

The author regards this diagnostic measure of such considerable importance that he practises it as a routine procedure in a large proportion of all cases coming into his hands.

Vaginal Examination should also be noted in this connection as an additional aid in diagnosis in the case of female patients. The relations between the rectum and the uterus and its appendages is so intimate that it need only be mentioned to justify and emphasize the propriety of this suggestion.

Examination of the Feces.—In order to determine the exact nature of the pathology in certain cases microscopic examination of the feces and other discharges may be necessary. In amebic ulceration, for example, the clinical diagnosis may be quite clear, but it is a source of no little satisfaction to have it verified by the microscope, and at the same time nothing is so effective in securing the co-operation of the patient as to demonstrate the organisms in a state of activity to him. For the analysis of feces and discharges here contemplated the services of an expert pathologist are usually required.

The author would again impress the fact that, until the diagnosis has been positively and correctly made, a patient has the right to demand that every resource of modern science shall, if necessary, be exhausted in his behalf.

CHAPTER III.

Constipation—Obstipation.

CONSTIPATION.

STRICTLY speaking, constipation is a symptom, not a pathologic entity. Yet the application of the term in the latter sense is justified both by custom and expediency. Headache, cough, and albuminuria are symptoms, but in common use they refer to very definite phenomena, and it would be difficult to replace them with terms at once as clearly and tersely descriptive of the conditions they indicate.

It is doubtless true that constipation is the most frequent of all human ailments. Either as malady in chief or as modifying factor it confronts the physician at every turn from the very outset of his professional career. In all ages and climes and among all peoples, so far as medical history may be credited, the story is the same. Yet in spite of frequency and universal prevalence, and notwithstanding the great volume of literature pertaining to it, the modern conception of the subject is chiefly notable for the confusion and indefiniteness which characterize it.

In a general way it may be said that constipation is an affection in which, either directly or indirectly, the entire organism is implicated. It is manifestly, therefore, not within the proper scope of the present work to attempt an exhaustive consideration of the subject. But the relations between constipation and anorectal disease are so fundamental and intimate that a clear comprehension of the former is an essential prerequisite to intelligent study of the latter.

Much of the confusion in reference to constipation most probably springs from lack of definite idea as to the true meaning of the term. Neither hard stools, nor dry stools, nor other kind of stools constitute the disease. These expressions are merely descriptive of physical properties and the term *costiveness* embraces them all. Constipation is something other and more. Correctly speaking, it is the condition of which costiveness is merely a symptom. Costiveness is not necessarily to be regarded as pathologic; constipation always is. The former may be due to accidental and temporary causes and leave no ill effects; the latter represents an established condition which in greater or less degree involves the general health.

Again, constipation is a relative term. The line between the physiologic and the pathologic is not clearly drawn. Accepting one alvine dejection a day as the normal average, remarkable differences in individual habit are met with, in which there is no appreciable departure from the ordinary standard of health. With one person two movements of the bowels a day may be the normal; with another, one movement in two days. And cases are on record by reliable observers in which not only days, but weeks and even months, elapsed without an evacuation, and still the patients lived and flourished. So that neither the physical characteristics of the stools nor the intervals between them can be properly regarded as distinctive of the disease.

Definition.—What, then, is constipation? Broadly defined, it is *that condition of the alimentary canal which is characterized by perversion of its function, resulting in the habitual pathologic retention of fecal matter.*

ETIOLOGY.

The causes of constipation may be divided into predisposing and exciting. Among the former, heredity, climate, occupation, age, and sex may be mentioned in passing. That such factors may sometimes play an important part in the development of this condition is so obvious as not to require extended discussion.

Exciting Causes; Violation of Hygienic Law.—Under this head belong errors of diet and improper habits of life, to one or both of which sources, without doubt, a large proportion of all cases are attributable. Chiefly notable in regard to diet are the two extremes of habitually consuming food which leaves too much or too little residue. Evil results equally from both. Peristalsis is largely dependent on the mechanical irritation of the bowel contents. In the one case this is interfered with by overdistention from the excessive accumulation of refuse material; in the other, the amount requisite for the proper degree of stimulation is lacking.

The quality of the food is likewise often at fault. Many articles of diet have in themselves a constipating tendency, particularly the rich, concentrated, highly seasoned dishes partaken of from day to day by those who regard the gratification of appetite as the chief end of existence. This applies also to beverages. To the immoderate indulgence in tea, coffee, and alcoholic drinks the trouble in its inception and maintenance is not infrequently to be attributed.

In this connection it is important to note that the ingestion of insufficient quantities of fluids may be a potent cause of constipation. When we remember that normal fecal matter is composed of approxi-

mately 75 per cent. of water, the necessity of keeping the system well supplied with this important constituent is apparent. It is probably a fact that the great majority of those who suffer from this complaint are small consumers of water.

With reference to habits of life, it may be said that a very large percentage of all cases of constipation originate primarily in disregard of nature's requirements. The exclamation of the old physician, to the effect that if his bowels moved normally in the morning he felt sure he would not die that day, contains the germ of a profound truth. In the hurry and turmoil of modern life, particularly in the large centers, attention to this function is made a matter of convenience, and disease is the harvest of neglect. Ignorance is often the explanation of such neglect. When the people are made to realize that the duty they owe themselves in this respect is at least as imperative as the duty of eating when hungry or resting when fatigued, one of the most prolific causes of constipation will be in large measure eliminated.

Defective Innervation.—This expresses itself either in (a) atonicity of the muscular coats of the intestine, resulting in impairment of peristalsis; or (b) in decreased secretion. These conditions usually coexist and, as a rule, are secondary to other disorders, of which the various forms of indigestion are the most frequent. The largest group of cases exemplifying these causative factors is to be found in those of sedentary habits, in whom digestive disorders are the rule rather than the exception. Paralysis of the bowel function as the result of organic changes in the central nervous system should be referred to under this head.

Though mentioned as a separate cause, it is evident that defective innervation may be merely the effect of other causes. In fact, however brought about, it is a condition which may be said to exist to some extent in practically every case.

Constitutional and Chronic Diseases.—Closely allied to the preceding, but entitled to separate classification, is the sluggishness of bowel function, often amounting to true constipation, met with in many diseased and debilitated states of the general health as the result of the associate muscular weakness, glandular inactivity, etc. Of such causes anemia and chlorosis, diabetes, chronic cardiac, hepatic, and renal diseases, obesity, relaxation of the abdominal walls due to repeated pregnancies, and the debilitation of convalescence may be cited. The author has observed quite a number of most obstinate and intractable cases following prolonged attacks of typhoid fever.

Self-medication.—A more obvious and familiar cause of constipation is the habit of self-medication. The pernicious effect of this practice

is beyond dispute. Yet its prevalence, already alarmingly widespread, is increasing at a rate which bids fair soon to make it universal. Fostered and encouraged by conscienceless advertisers, it belongs to the large and ever-growing class of evils for which a venal press is responsible, and for the suppression of which the only rational hope at present seems to lie in the slow process of popular education.

Entitled to first consideration under this head is the habitual use of purgative medicines. Almost without exception the remedies of this class in general use are effective solely because of their irritant properties, and their frequent repetition necessarily results in overstimulation of the glandular mechanism and a low grade of inflammation of the mucosa. While conceding that the chronic proctocolitis practically always present in long-standing cases of constipation may be produced by the mechanical action of the altered feces, the author believes that repeated resort to purgatives is more frequently the true explanation.

But the abuse of purgatives is not the only form of self-medication which may be a factor in the production of constipation. A large proportion of the advertised nostrums contain alcohol or other ingredients which have such tendency. And it is well known that in many cases of drug addiction, for a large percentage of which this practice is directly responsible, constipation is a constant and most troublesome complication.

Mechanical Obstruction.—Constipation due to this class of causes is distinguished by the designation *obstipation* (obstructive constipation). Such obstruction may be either extraintestinal or intraintestinal, and occur at any point of the intestinal tract. Of the former class (extraintestinal) may be mentioned neoplasms of any of the abdominal or pelvic viscera, the gravid uterus or retrodisplacements of that organ, inflammatory bands, ascitic accumulations, etc.

The intrarectal causes which may operate to the same end are very numerous and vary widely, both in character and location. Angulations in the gut, malformations (congenital narrowing, atresia), splachnoplethosis, intussusception, diverticula, foreign bodies, new growths, organic stricture, abnormal conditions of Houston's valves, and hypertrophy of the external sphincter are all causes which in certain cases may result in the retention or incomplete evacuation of the feces. Of these only the two last mentioned will be here separately considered:—

Houston's Valves.—From the nature and arrangement of these structures as described in the chapter on Anatomy, it is evident that, when altered by disease so that they offer increased resistance to the descent of the feces, their function of physiologic retardation may rapidly merge into pathologic obstruction. And it is also apparent from their

PLATE VI.



Showing tube coiled in sigmoid and rectum.

PLATE VII.



Pelvic sigmoid, showing physiologic constriction in a patient recovering from acute diarrhea.

histologic structure that they are subject to all the disease processes which affect the rectal mucosa and, on account of their positions with reference to the bowel lumen, are, in addition, peculiarly exposed to irritation and traumatism. It is altogether conceivable, therefore, that when the subject of chronic inflammation, either originating in the valves themselves or extending to them from adjacent parts, they may become thickened and stiffened (hypertrophied) and in consequence offer abnormal resistance to the progress of the fecal mass. As the final stage of changes thus begun the inflammatory deposit in the valves occasionally undergoes organization, converting hypertrophy into fibrosis, a condition from which an even greater degree of obstruction results.

It is possible for an obstructive condition of the valves to be encountered without a precedent or coexistent inflammation to account for it. In such cases congenital overdevelopment or abnormal relative location of the valves is probably the explanation. A few cases of this kind have been reported as occurring in very young children.

From a scientific standpoint the matter of chief concern in connection with the subject is, not who discovered the valves, nor who first pointed out their pathologic possibilities, but to recognize that they may be or become pathologic factors and, in the study of constipation, to accord them the importance as such to which they are entitled. At the same time it is proper that the work of those whose painstaking and exhaustive investigations have resulted in a valuable addition to our knowledge of the subject should be recognized and duly accredited. The brilliant writings of T. C. Martin constitute the first systematic presentation of the valve problem. Even though many of his conclusions have not received the indorsement of other workers in this field, he is certainly entitled to full credit for priority and originality, and his name will probably be as inseparably associated with the rectal valves as that of Houston himself.

Hypertrophy of the External Sphincter.—In discussing the anatomy of the external sphincter and the physiology of defecation (Chapter I, pp. 17 and 29) it was pointed out that the functional activity of this muscle is limited to voluntary contraction,—that true relaxation does not take place except under abnormal conditions (*e.g.*, paralysis). The phenomena occurring when feces are voided, properly interpreted, do not prove that the action of the sphincter is temporarily inhibited at such times, but are simply the result of mechanical pressure overcoming resistance which, under normal conditions, is purely passive. But when the muscle from any cause remains in a state of spasmodic contraction or has become hypertrophied from long-continued overactivity, it is quite obvious that a definite and positive obstruction to defecation is

established. Mathews¹ says: “. . . it is clearly demonstrable that the external sphincter muscle is a great if not the greatest factor in producing constipation.” While this is of course an extreme statement, it is certainly true that the active cause in maintaining constipation, if not in originating it, is often to be found in this muscle, and its condition should invariably be carefully investigated. Under the next heading the methods by which this obstructive condition of the sphincter is brought about will be further discussed.

It is held by some writers that a similar obstructive condition may be produced by the levator ani muscles at the proximal end of the anal canal. This is rather difficult to conceive when we remember the size of these muscles and the nature of their attachments, for the reason that it is hardly supposable that a limited portion of the fibers of any muscle could undergo such a change as hypertrophy. The author believes that when pathologic obstruction occurs at this site it is probably always due to a disease process involving the muscle sheaths rather than the muscle substance, and that the resulting changes are much more nearly allied to fibrous stricture than to true hypertrophy.

Painful Lesions of the Anus.—The relations between constipation and certain anorectal diseases are especially noteworthy in that either may be cause, effect, or occasionally both, with reference to the other. With respect to constipation, it is clearly demonstrable that certain lesions, particularly those of the anal canal, often stand to it in the light of causative factors. With respect to anorectal diseases, it is a rule to which there are no exceptions that every lesion in the entire category may either be caused or seriously modified by constipation. And either effect, once established, reacts powerfully and positively in intensifying the very condition which gave rise to it.

The external sphincter is an exceedingly sensitive muscle. Even when there are no lesions present, rough or abrupt manipulations are resented by spasmodic reflex contraction which the strongest effort of will cannot prevent. This is one of the most striking examples of reflex action of a voluntary muscle to be found in the body. When such reflex action is occasioned by a lesion in the sphincter area the spasmodic contraction is not only stronger, but is practically continuous, and a true hypertrophy of the muscle ultimately results.

In addition it must be noted that the pain itself, which is practically always characteristic of such lesions, is an etiologic factor to be reckoned with. Under such circumstances, the passage of a stool of even normal size and consistence is an event contemplated with reluctance and dread.

¹ Diseases of Anus, Rectum, and Sigmoid Flexure, 2d edition, p. 57.

Remembering that defecation is in large measure a voluntary process, this is an item of greater import than might at first glance appear, and while applicable, perhaps, with special force to children, so long as human nature shrinks from suffering, painful lesions of the anal region must be recognized in the etiology of constipation.

In subsequent chapters we shall have occasion to speak of constipation as an etiologic factor with reference to practically every separate disease discussed. Explanation of this universal causal relation is to be found in the mechanical interference with the circulation of the rectum which constipation always occasions. Venous congestion is one of the great underlying factors in the production of rectal diseases, and the anatomic position and structure of the organ, together with its peculiar function, render this to greater or less extent its normal condition. Constipation necessarily augments it. A collection of feces in the sigmoid or rectum acts as an impediment to the return blood-current; and the dislodgment and extrusion of such accumulation, requiring as it does the co-operation of powerful auxiliary muscles, must result in converting passive into very active congestion, at the same time furnishing ready means for the infliction of traumatism. Fissure, hemorrhoids, prolapsus, pruritus, proctitis, ulceration, abscess, and fistula are the most conspicuous lesions which may in many cases be traced directly to constipation and its coincident phenomena.

The present unsettled state of our knowledge of the etiology of malignant growths permits no definite assertion in regard to them. But discriminating observations justify the assumption that mechanical irritation is a factor both constant and weighty in determining their sites of development. If friction is admitted as a causative agency, the function of the rectum, particularly when it has to do with costive stools, would account for the disproportionate frequency with which intestinal cancer is located in this organ. To place malignant growths, therefore, in the list of rectal diseases for which constipation may, in a sense at least, be responsible seems not altogether unreasonable. The analogous nature of the gross lesions resulting from syphilitic and tuberculous deposits in this locality would warrant a similar deduction in regard to them.

SYMPTOMS.

The symptoms of constipation may be divided into three classes: local, reflex, and constitutional:—

Local Symptoms.—While sphincter spasm and the several anorectal diseases above enumerated may be produced by other causes, they occur so constantly as the results of constipation that when present they

are to be regarded as strong presumptive evidence of the existence of that condition. In this sense they are properly classed as local symptoms, and error will not often be committed in so considering them.

Reflex Symptoms.—For the most part these are due to the mechanical irritation and pressure of the pathologically retained feces; and since the rectum and sigmoid flexure constitute the usual receptacles for fecal storage, we would naturally expect that any reflex originating from this source would be referred to the pelvic region. Backache located in the sacral region, uterine and ovarian neuralgia, vesical irritability, pain in the testicles, penis, deep urethra and prostate, impotence, sensations of weight and discomfort in the perineum, dull aching of the hip-joint (usually the left) or other parts of the lower extremity,—in short, disturbance of any of the parts supplied by the nerves of the sacral plexus may be encountered. In cases in which the higher portion of the colon are also involved the reflex irritation may be manifested in any of the abdominal organs. It is not at all unusual for colicky pains in the right iliac fossa closely simulating those of acute appendicitis to disappear completely and permanently upon emptying the colon with a high enema or brisk purgative.

In childhood nocturnal enuresis is often attributable to this cause, as are occasionally also other reflex phenomena, such as a peculiar brassy cough, chorea and other nervous disturbances, and sometimes even convulsions.

Constitutional Symptoms.—The constitutional symptoms of constipation are very numerous. In addition to absence of the accustomed evacuation, in acute cases there may be a sudden elevation of the temperature of several degrees, accompanied by headache, malaise, and anorexia, and a feeling of heat and fullness in the rectum, all of which promptly disappear when a free movement of the bowels is secured.

It is probable that most cases of chronic constipation begin with repeated attacks of the acute form, the general system gradually becoming less responsive to interruption of the bowel function, and the bowel itself more tolerant of the presence of costive feces. Thus insidious in its onset, the condition is apt to become established before the patient fully realizes the true nature of the shoals toward which he is drifting.

In the beginning of chronic constipation the first symptoms to attract attention are those which pertain to the altered character of the stools. The patient will notice that it is more difficult to effect a passage and that the feces voided are diminished in quantity, dry, lumpy, and perhaps covered with mucus. He will then probably remember that for some time the desire to evacuate the bowels has been decreasing and

that the intervals between evacuations have gradually become prolonged. He will also begin to realize that he does not feel well, that he has slight headache every day, that there is a bad taste in his mouth, that his tongue is furred, that his appetite is failing and his digestion poor, that he is troubled with flatulence, that his muscles ache and easily become fatigued, that he is indisposed to exert himself physically and unable to concentrate his mind as formerly,—in short, he will awaken to the fact that his general health is below the normal standard.

Later, all the above symptoms become exaggerated and in addition others develop, such as broken and unrefreshing sleep, loss of flesh, sallow complexion, palpitation of the heart, tinnitus, disordered vision, dizziness, etc. Occasionally, in susceptible individuals, such pronounced effects as hysteria, hypochondria, and melancholia have been observed. In these extreme instances autointoxication is usually the explanation advanced for the condition. But it is evident that the only difference between such cases and those presenting the milder type of symptoms is one of degree. Aside from the effects which are due to mechanical irritation and pressure, the symptoms of constipation might well and correctly be grouped under the general term autointoxication.

DIAGNOSIS.

The fact of pathologically delayed or insufficient fecal evacuations is readily established by the patient's statements. But the determination of the cause or causes which are operative in a given case requires the careful and systematic employment of every possible method of investigation. The previous history of the patient with special reference to the functional activity of the bowels; his former state of health, habits of life, social and business environments; the symptoms present and the length of time they have been in existence,—in a word, everything which could possibly have a bearing upon the case must be inquired into and the resulting information duly weighed. This should be followed in every case by a thorough physical examination in which no organ or function of the body escapes attention. Bearing in mind the number and diversity of the factors which may enter into the etiology of constipation, it is evident that nothing but the most comprehensive investigation will be adequate. The rectum must be systematically explored not only to ascertain possible causes of the condition, but also to determine what, if any, local lesions have been produced by it. It is safe to say that in a large majority of cases pathology, primary or secondary, will be found in the rectum or colon which calls for active and intelligent treatment.

No other condition, with the possible exception of fecal impaction, is likely to be mistaken for constipation. In the former the

history of the case, the pressure symptoms, and the diarrhea not infrequently associated with it, supplemented by the inevitable physical examination, will usually suffice for a differentiation.

TREATMENT.

In view of the many and varied factors which enter into the etiology of constipation, the first essential in the management of a given case is to determine the cause or causes upon which it depends. This is not always a simple matter; but intelligent and painstaking investigation will rarely fail to repay the time so expended. Unfortunately, the diagnosis of constipation too often suggests purgatives as the only therapeutic indication. Nothing could be more irrational or more hopeless than to undertake the treatment upon such a preconceived fallacy. While purgatives certainly have a place in the treatment of constipation, it were far better for the patient if the idea prevailed that their proper application has reference only to the symptom, costiveness.

To facilitate discussion the treatment of constipation may be considered under the following separate headings:—

Hygienic,
Medicinal,

Surgical;
Miscellaneous.

It is to be understood, however, that this classification refers rather to principles than to distinct methods of treatment, and that principles and methods must be intelligently combined to successfully meet the requirements of each individual case.

Hygienic Treatment.—What is said under this heading has the double significance of applying to prevention as well as to cure. For that reason it is of special importance and might well receive more extended notice than can here be accorded it.

In discussing etiology it was stated that very probably the majority of all cases of constipation are due to violation of hygienic law, *i.e.*, improper diet and faulty habits of life. A surprisingly large number of people neither know how nor what to eat. While it is true that the train of digestive disorders which form so common an accompaniment of constipation may occasionally be effects, they are far more often to be regarded in the light of causes. It is well, therefore, that the matters of diet and table hygiene be carefully investigated. Many modern food products are so concentrated and ultrarefined that they have in themselves a constipating tendency because of the decreased bulk of the residue resulting and because, also, of the elimination of the coarser elements which serve the important purpose of exciting

peristalsis. The so-called "patent" flours are notable examples of such products and, for general use, might be replaced with advantage by the more wholesome "Graham" and "Whole Wheat" brands. Condiments, fried articles, pastry, alcoholic drinks, coffee and tea, and rich and highly seasoned foods, as a class, should be interdicted, and the patient advised to confine his diet to a plainer bill of fare, specific directions being given as the needs of the case may indicate. He should also be instructed how to eat, two points being specially stressed: *first*, that the food should be thoroughly masticated; *second*, that fluids, if taken at all during meals, should not be taken until the mouth is emptied of solid food.

As before suggested, the insufficient consumption of water may be a cause of constipation. The patient's habits in this respect should always be inquired into. Not infrequently the whole trouble may be overcome by judicious advice along this line. A half-pint or so of water, preferably hot, taken before breakfast will often produce un-hoped-for results. To impress the patient, the addition of a pinch of table-salt to each glassful may be recommended, and for the same purpose he may be instructed to drink freely of some mineral water during the day. The author does not remember having seen a pronounced case of simple chronic constipation in a patient whose habits were beyond criticism on this point.

Some varieties of fruit form a valuable addition to the dietary of these patients. Those containing citric acid (lemons, oranges, grape-fruit) are especially useful because of their power to stimulate the secretory apparatus, both intrinsic and accessory, of the intestinal tract. Not every patient, however, can digest fruits, and individual idiosyncrasy must determine the kind and extent to which they may be employed.

Attention should here be called to the fact that bananas are uniformly detrimental to those who suffer from constipation. Difficult of digestion under ordinary circumstances by reason of the readiness with which it undergoes fermentation, this fruit should be scrupulously avoided when the functional activity of the alimentary canal is at all subnormal.

Faulty habits of life are probably quite as often responsible for constipation as improper diet, though the connection is not usually so direct and easily traced. Sedentary occupations, lack of out-of-door exercise, poorly ventilated sleeping apartments, and similar factors are doubtless often the underlying causes in the inception at least of the trouble. All such errors should be corrected, specific instructions adapted to his particular case being given to the patient on each point.

In addition he should be advised as to the importance of maintaining a healthy condition of the skin. For this purpose nothing gives such happy results as a daily cold bath followed by a brisk rub, when the patient's vitality is sufficient to insure prompt and complete reaction; otherwise the warm bath should be substituted. In this connection advice should also be given as to the proper wearing apparel, the fact being impressed that the primary purpose of clothing is hygienic rather than decorative.

But the most important consideration connected with the hygienic management of these cases has reference to the function of defecation. Neglect of this function is in some measure an etiologic factor in probably every case of confirmed constipation. With the exactions of modern life, business and social, such that the average individual can only spare ten minutes for his midday meal and less than six hours for sleeping, he can scarcely be expected to devote any time to the performance of this homely function. False modesty, and inconvenient or insufficient toilet arrangements, likewise contribute to the neglect of this function. Delay, loss of desire, costiveness, and constipation form a sequence of events operative in a larger number of cases than is even suspected.

If one, in his clinical work, will pay close attention to this phase of the subject, he cannot fail to be impressed that the advice this class of patients stands most in need of has reference to the *hygiene of defecation*. To be of value such advice should be specific rather than general, and should include the following points which may be amplified and emphasized as the circumstances suggest:—

1. Regularity of habit. This is all-important. In regard to habits in general man is first creator, then creature. A definite hour, preferably soon after breakfast, should be set apart for this function and *utilized for the purpose*, whether or not the desire is imperative or even present. Nature only demands a fair chance, and the habit of evacuating the bowels at a certain hour each day can be acquired as readily as any other daily habit.

2. Exclusive attention to the act. The water-closet is not intended for a reading-room and, while there, the purpose of the visit should not be lost sight of. Any bodily function at all dependent on the will is better performed when the attention is concentrated upon it.

3. Sufficient time to be allowed. The act is usually not complete with one dejection, and haste leads to straining, which is directly responsible for many rectal troubles.

4. Proper detergents. The anal tissues are extremely delicate and sensitive, especially following a stool, when there is more or less eversion.

Soft materials and gentleness should always be employed. Printed paper is especially to be avoided.

5. Calls to stool never to be voluntarily postponed. Under forced delay the desire is apt to pass away not to recur, as a rule, for twenty-four hours. Not only is costiveness the result, but, when often repeated, the sensibility of the rectum becomes obtunded and the foundation for the development of confirmed constipation as well as of local disease is gradually but surely laid.

As a final word upon this phase of the subject the author wishes to most heartily endorse the sentiment so graphically expressed by Tuttle² :—

“The proper location of the toilet-room is of more importance to a family or school than the elegance of their parlors. This should be so placed that neither weather, darkness, nor publicity should ever interfere with its use. The accommodations should also be adequate for all necessities. One water-closet is entirely inadequate for a family of five or six, and when one sees large boarding-houses or schools with only two little dark water-closets, one wonders how the inmates remain as healthy as they do.”

Medicinal Treatment.—The treatment of constipation by drugs comprehends much more than the administration of purgatives. It cannot be too strongly emphasized that these agents are only of secondary and minor importance and that their indiscriminate use is far more likely to be followed by harm than benefit. Yet it would be difficult, if not impossible, to manage many cases without them. Properly employed, purgatives and laxatives serve the single purposes of emptying the bowel of pathologically retained feces, and when this purpose is accomplished their usefulness ends, at least until a recurrence of the same condition again demands them. It is irrational and absurd to expect or attempt to remove the cause of a condition by directing attention solely to one of its symptoms.

The intelligent application of the medicinal treatment of constipation requires that the cause be first accurately determined, and that the remedies employed be selected to meet the definite indications of the case.

If the digestion is at fault, in conjunction with regulation of the diet and other appropriate measures, such agents as pepsin, pancreatin, and diastase may serve a useful purpose until the normal glandular activity can be restored. Digestive disorders are often accompanied by fermentation, in which event such drugs as salol, boric acid, beta-

² Diseases of Anus, Rectum, and Pelvic Colon, p. 550.

naphthol, subcarbonate or subnitrate of bismuth, charcoal, etc., may be added.

When the liver is sluggish from overeating or other causes, the preparations of mercury are undoubtedly the most efficient remedies. Calomel in $\frac{1}{4}$ - to $\frac{1}{2}$ -grain doses every hour till 2 or 3 grains are taken, is a very satisfactory method of administration, though the author prefers the following:—

℞ Mass. hydrargyri gr. v.
 Pulv. rhei gr. x.
 Sod. bicarbonat. gr. xv.

M. et ft. cap. no. v.

Sig.: One every hour till all are taken.

Copious draughts of hot water taken on an empty stomach are sometimes alone sufficient to relieve the condition. The efficiency of this remedy may be increased by the addition of a saline, preferably the phosphate of sodium or Rochelle salts, in teaspoonful doses, repeated several times a day until the desired result is obtained.

When defective innervation is established as the salient etiologic factor the remedies should be chosen with a clear idea of what is expected to be accomplished by them. If the condition is one of impaired peristalsis, nux vomica or its alkaloid, strychnine, is the one drug to be relied upon for overcoming the muscular atonicity. To get the full benefit of this agent it should be administered fearlessly, even, when necessary, to the production of its physiologic effect. If, on the other hand, the faulty innervation expresses itself in decreased secretion, as shown by the habitually dry character of the stools, a variety of remedies may be employed. In the majority of such cases insufficient quantities of water are consumed. Explicit instructions on this point should be given and a definite daily amount, apportioned to the needs of the case, advised. By specifying some bland "mineral" water, such as Poland, Bowden Lithia, or Bethesda, the co-operation of the patient may be more readily secured. Salines, acids, and the bitter tonics, administered in small quantities largely diluted, are of great benefit in this condition. Glycerin also is a useful adjuvant. A prescription which meets the several indications in this general class of cases, and which has given the author considerable satisfaction, is the following:—

℞ Ac. nitrohydrochlor. ℥ v.
 Tr. nucis vom. ℥ viij-℥.
 Glycerini ʒss.
 Ess. pepsinæ q. s. ad ʒss.

M. Sig.: Take in glass of water immediately after each meal.

Very often it will be found that the medicinal treatment of the constipation is of secondary importance to other medicinal needs of the patient. Constipation is, quite frequently, merely a manifestation of general debility or some constitutional disorder. In such case it would obviously be of little avail to treat the former and ignore the latter. Under these circumstances, while proper attention to the bowel function is not to be omitted, restoration of the general health becomes the prime object of treatment. Iron, arsenic, strychnine, quinine, the bitter tonics, codliver oil, and other stimulants, tonics, and general restoratives in many cases constitute the only class of remedies from which permanent benefit is to be derived.

Purgatives constitute far the most numerous class of drugs in the materia medica. From their vast number and the enterprise and ingenuity which have been expended in adding to them, it would seem that the troubles of the human race with reference to at least one of its bodily functions have always been the object of special solicitude. Aperients, laxatives, cholagogues, and cathartics are terms applied to various groups of these drugs in the effort to classify them,—an effort which at best can be said to have met with only indifferent success. No attempt can here be made to discuss these several groups, much less the individual agents composing them. As the most practical means of avoiding confusion on the subject the author would advise that a limited number of the drugs of each class be selected and regularly employed so that perfect familiarity with their actions may be acquired. Satisfactory results are much more likely to be secured from a drug which is well understood, by varying the dosage or method and frequency of administration to meet special indications, than from drugs with which one has had little or no personal experience.

Considering effects only, castor oil is undoubtedly the most generally useful of the purgatives when a simple unloading of the bowel is desired. In postoperative cases it is especially to be recommended for the reason that its action is reliable, complete, fairly prompt, and, as a rule, painless. It may be advantageously combined with an equal part of glycerin, which serves the double purpose of promoting its action and modifying its objectionable taste. When flatulence is present the addition of a few drops (5 to 10) of turpentine will be found beneficial, and a like quantity of tincture of opium will correct any tendency to griping.

When it seems advisable or necessary to administer agents of this class regularly for a considerable time, the well-known laxative mineral waters will be found useful. Most of these waters depend for their action upon the sulphate of sodium (Glauber salt) they contain, and are most effective when given in large dilution on an empty stomach.

Convenience of administration is, however, practically the only advantage they possess.

The familiar aloin-strychnine-belladonna (a.s.b.) pills are widely employed for the same purpose. Viewing the question from the standpoint of the proctologist, the laxative ingredient in this combination is certainly open to criticism. It is well recognized that the action of aloes is exerted chiefly upon the large bowel, more particularly upon the pelvic portions, and the more or less continuous congestion resulting from its daily use would necessarily favor the development of local disease.

Cascara sagrada is a drug as to the value of which there is considerable difference of opinion. When trustworthy preparations are obtainable the author regards it as one of the most reliable agents of the purgative class. The fluidextract in doses of 10 to 20 minims in a dram of glycerin given several times a day is one of our most efficient remedies for promoting peristalsis and restoring the muscular tone of the intestinal tract. Cascarin is also a valuable preparation and lends itself more readily to combination. An eligible prescription to meet the indications above specified is:—

℞ Cascarin gr. ss-ij.

Ext. nucis vom. gr. ¼.

M. et ft. pil. vel cap. no. j.

Sig.: Take 1 night and morning as needed.

Extract of hyoscyamus, gr. ss, or extract of belladonna, gr. ⅛, added to each pill or capsule is useful both as an adjuvant and corrective in certain cases.

The comparatively new drug, phenolphthalein, has proved one of the most satisfactory agents of this class in the writer's hands. It seems to be a simple purgative, pleasant and reliable in action, and without deleterious after-effects. The dose is 1 to 3 grains, in tablet or capsule. It is marketed in the form of confections under a variety of trade names.

Where for any reason it is advisable to continue the administration of such remedies over prolonged periods, it frequently becomes necessary to change from one agent to another, usually at short intervals. Cascara is justly reputed to be less objectionable on this account than most other drugs. When the necessity for a change arises, however, podophyllum, rhubarb, and senna are perhaps the least harmful substitutes which can be chosen for temporary use.

The so-called "drastic" and "hydragogue" cathartics, such as jalap, colocynth, scammony, gamboge, elaterium, and croton oil, have a very limited field of application. Occasionally they may be useful

in emergencies or to meet certain special indications; but they certainly have no proper place in the treatment of constipation.

Surgical Treatment—Obstipation.—When the constipation (obstipation) is due to mechanical obstruction surgery frequently offers the only means of affording relief. The kind of surgical intervention demanded will depend upon the nature and location of the cause. Abdominal section for the removal of extrarectal pathology occluding the gut, colostomy, colopexy, correction of malpositions of the uterus, perineorrhaphy, prostatectomy, excision or resection of the rectum, and operations upon obstructive lesions situated within the rectum are a few of the long list of surgical procedures which may be required in such cases. Only the last-mentioned class will be considered in this place; but it may be said in passing that the rectal specialist who expects or assumes to meet all the requirements of his work must obviously be not only a skillful diagnostician, but also an accomplished general surgeon.

In discussing etiology it was pointed out that pathologic obstruction of the fecal current may occur at several sites in the rectum and be produced by a number of conditions. Exclusive of the various forms of organic stricture, these are hypertrophy or tonic spasm of the external sphincter, diseased conditions of the levator ani muscles (or rather of their fibrous coverings) resulting in undue contraction and rigidity, and certain pathologic changes in the rectal valves by reason of which they become obstacles to defecation.

With reference to the sphincter muscle as an etiologic factor it is only necessary to bear in mind that painful lesions or irritations of whatever kind in the anal zone uniformly excite contraction of this muscle, and that overaction here as in other muscles ultimately results in hypertrophy. Thus, the sphincter may be converted into an obstacle which the normal forces of defecation are unable to overcome.

The levator ani muscles are less often to be reckoned with as factors in obstipation. That they may be such, however, is beyond question. This fact becomes obvious when it is remembered that the pelvic fascia and its processes form the investing sheaths of these muscles, and that these sheaths are directly continuous with the connective tissue of the bowel walls. When the subject of inflammation, particularly of the chronic type, hyperplasia and contraction of these structures may result. As previously observed, the changes which lead to obstruction at this site are closely analogous to those of fibrous stricture.

Study of the anatomy and histology of Houston's valves makes it clear that these structures must participate by direct continuity of

tissue in all general inflammatory affections of the rectal mucosa. The history of such affections shows a peculiar tendency to chronicity, and the effects of chronic inflammation of mucous membrane, here as elsewhere, are hyperplasia, organization of plastic deposit, contraction, rigidity, etc. The final effect of such changes upon the valves is self-evident. From physiologic organs performing a beneficent function they are transformed into disease-producing obstructions. The degree of obstruction occasioned by them is determined by several factors, *i.e.*, the number of valves involved, their relative situations, extent of attachment, and amount of projection into the bowel lumen, as well as upon the pathologic changes incident to the disease process.

Obstructive valves are met with under two very different conditions, between which it is of the utmost importance that careful discrimination be made. The primary result of the inflammatory process is hypertrophy; the secondary result, when organization of the plastic material and contraction have occurred, may be termed fibrosis. The two conditions may be readily differentiated under proctoscopy, and their recognition is a matter of great moment in determining the proper treatment.

In addition to the general symptoms of fecal retention, certain distinctive symptoms are usually presented in cases of obstipation. When the sphincter or levator ani muscles are at fault the sensations of the patient will generally enable him to locate the trouble fairly accurately. He will complain that the anal canal seems too small, and that he is unable to secure an evacuation without first softening the fecal mass with an enema or taking an active purgative. Even then, he will explain, the stools are small and ribbon-shaped, and their passage is followed by a sensation that the act has been incomplete, with throbbing and tenderness in the anal region.

When the trouble is with the rectal valves the subjective symptoms are not so well defined. The patient will perhaps refer to a more or less constant sensation of fullness and weight in the rectum. He will also speak of the necessity of straining at stool in order to secure an evacuation even when the feces are of normal consistence, and of non-effective efforts to empty the bowel under such circumstances. In many cases enemas cannot be satisfactorily employed for the reason that they will not pass beyond the rectum, or, if they do penetrate to the higher parts, are apt to be indefinitely retained. Abdominal tenderness and tympany are not infrequently encountered, particularly in the more obstinate cases. A more constant symptom, but one of only relative significance, is the greater or less quantity of mucus

passed with the stools. This is due to the associate rectitis and is sometimes blood-stained.

The diagnosis of obstipation, especially with reference to the important point of determining its exact cause, requires both judgment and experience. No other instrument than the finger is necessary to detect the trouble if it lies in the anal canal. It is advisable, however, to supplement the digital examination with the use of the anoscope in order that the search for associate or causative lesions may be more thorough. Properly employed, this may be done with the infliction of very little pain in the majority of cases.

Examination of the valve area requires a less simple technique. Under proctoscopy each valve should be tested as follows: A long probe or uterine sound, having three-quarters inch of its distal extremity bent to a little less than a right angle with the shaft, is introduced through the proctoscope and hooked over the valve's free margin (Fig. 44). In the normal state gentle traction upon the probe will

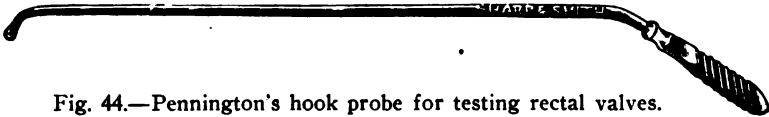


Fig. 44.—Pennington's hook probe for testing rectal valves.

cause sufficient effacement of the valve to disengage it. When diseased to an obstructive degree, on the contrary, no such effacement occurs, but the valve is drawn toward the anus in proportion to the force employed. Delicacy of touch and considerable experience are required to render this manipulation trustworthy for diagnostic purposes. An offending valve in a state of fibrosis presents very appreciably greater resistance to the probe than one which is merely hypertrophied. Further aid in the differentiation of these two conditions is offered by their dissimilar appearance. Hypertrophy is characterized by a dusky-red, congested color and a marked thickening of the entire structure; fibrosis, by a comparatively pale, bleached appearance and a thin, tightly drawn aspect. The former is obstructive because of its increased bulk, the latter because of its abnormal density and tension. Fibrosis being simply an advanced stage of a process which begins as hypertrophy, of course every gradation between the two will be encountered.

When the obstipation is referable to a pathologic state of the external sphincter the indications as to treatment are clear and definite. Gradual dilatation may be practised with promise of at least temporary relief. But divulsion under general anesthesia is the preferable mode

of treatment, in that by this procedure the desired end is at once accomplished and at the same time attention to any lesion of the anal canal is rendered possible. In the rare cases in which it is previously determined that there are no such complicating local lesions, complete division of the muscle is equally as effective in overcoming spasmodic contraction. This may be effected painlessly under local anesthesia, and has the additional advantage of setting the muscle at rest for a longer period. Occasionally it may be advisable to practise both divulsion and division at the same time. The technique of these two procedures will be described in detail in the chapter on Fissure.

When the levator ani muscles prove to be the seat of the trouble a different problem presents itself. Here, likewise, dilatation may result in temporary benefit. But in these cases the pathology resides in the fascial sheaths of the muscles rather than in the muscles themselves, and the changes differ only in degree from those encountered in fibrous stricture. Consequently, as might be inferred, permanent relief can only be expected from some form of surgical interference. If internal incision is chosen, it is of great importance that the anatomy of the muscles with special reference to the direction of their fibers be kept in mind. Incision in the median line, whether anterior or posterior, would accomplish nothing. Instead, it should be made bilaterally and in a direction obliquely outward and backward. Incisions made in this way and of sufficient depth at once relieve the tension, and union of the wounds is prevented by contraction of the severed muscles. It is apparent that, when this operation is resorted to, due provision for drainage must be made in order to overcome the danger of septic absorption. To this end preliminary divulsion or incision of the sphincter and a light gauze packing of the anal canal are indicated. Frequent antiseptic irrigations should also be employed.

Gant³ describes several operative procedures for the relief of this variety of obstruction which he states are original with him. One of these consists in severing the attachments of the levator ani muscles to the coccyx by subcutaneous tenotomy; or, he suggests, the same end may be accomplished by coccygodectomy, the linear wound being closed by sutures. "When the posterior bony attachments of the levator ani have been destroyed," he observes, "they no longer contract about the rectum sufficiently to obstruct the passage of feces." In one case, having failed to give relief by dividing the coccygeal attachments, he performed a myotomy, which he describes as follows: "Through a posterior median incision extending from the lower end

³ Diseases of the Rectum and Anus, 2d edition, pp. 102 and 103.

of the sacrum to within half an inch of the anus the coccyx was removed and the muscles severed on either side at the point where they cross the rectum. That portion of the muscles which had extended from the rectum to the coccyx was detached from the rectum and removed. The external wound was then closed with interrupted catgut sutures and dressings applied. The patient promptly recovered from the operation and was gradually relieved of the constipation."

These procedures have the advantage over the method of bilateral internal incision of being less likely to be followed by septic infection; but, if the author's view as to the pathology in such cases is correct, they do not meet the indications so well. Fortunately, cases of this kind are rarely encountered and when they are the operations mentioned are to be regarded only as *dernier resorts*.

The treatment of obstipation due to abnormal conditions of Houston's valves depends upon the type of the pathology and, to some extent also, upon the number of valves involved. In all cases the accompanying rectitis should first receive attention. For this purpose a weak solution of nitrate of silver (gr. iij-v to ʒj) applied through the proctoscope by means of the atomizer will give the speediest results. Where hypertrophy is the pathology to be dealt with, particularly in cases in which a single valve is implicated, a course of massage of the offending structures, in conjunction with the nitrate of silver spray and topical applications, will usually prove successful. The massage is most easily administered by means of the proctoscope. To avoid wounding the mucosa the obturator may be left in position or, to secure greater accuracy, readjusted when the instrument has been introduced to the proper height.

When it is determined that the obstructive condition is due to fibrosis instead of hypertrophy, resort to the measures above indicated will prove but a waste of time. Here surgery is demanded,—and surgery of a very special kind. As originally devised by Martin, the operation of "valvotomy" was applied indiscriminately to the obstructive valves, and consisted in incising their free margins down to the muscular coat, the resulting wounds being left to heal by granulation. Recognizing the undesirability of open wounds in a region constantly exposed to infection, he later devised a special technique for suturing the edges of the incisions, which, he tells us, when properly done will uniformly result in primary union. The performance of these ingenious operations requires an elaborate outlay of special instruments and a degree of operative dexterity which is only to be acquired by long experience. Even in the hands of the most expert they must be regarded as dangerous procedures.

To overcome the dangers incident to the cutting operation Pennington devised a spring clip and a special instrument for applying it, by means of which the same end is accomplished not only with comparative safety, but much more expeditiously (Fig. 45). In addition it has the advantage over the incision method, of removing a section of the valve, thus greatly diminishing the likelihood of recurrence of the obstruction. The action of the Pennington clip is due to pressure necrosis, and, even though the peritoneum is caught by it, no harm results, since the cavity is sealed off by the time the slough separates. Gant's "valve clamp" (Fig. 46) is a modification of the Pennington instrument, applying the same principle and accomplishing the same end. The former possesses the advantage of taking up less room when in position, and several may be applied to different valves at the same time

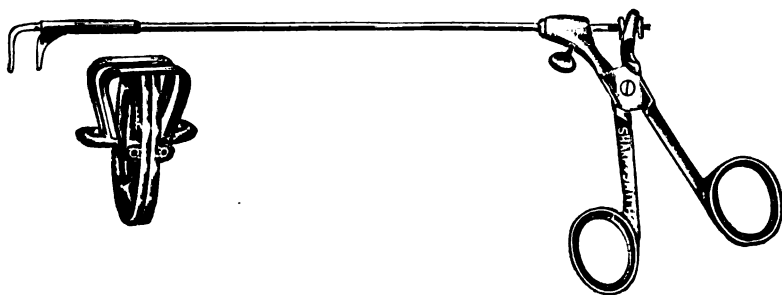


Fig. 45.—Pennington's spring clip and applicator.

without materially increasing the obstruction. Hirschman's ingenious method of dividing the offending valves by means of elastic ligatures, while not so simple in technique, is both safe and effective.

The author is strong in the opinion that when division of the valves is called for, the devices of Pennington, Gant, and Hirschman should entirely displace the cutting operation of Martin. The former are so free from danger and the technique of their application is comparatively so simple that they may be adjusted in the office and the patient allowed to resume his accustomed occupation without material inconvenience. On the other hand, the technique of the Martin method is extremely complicated and the instruments required numerous and difficult to handle. In addition the latter is a dangerous operation, the risks of hemorrhage, sepsis, and peritonitis being necessarily incurred.

If the facts could be known it would doubtless appear that a large proportion of the disappointments and failures which have been reported as resulting from operation on the valves has been due to improper selection of cases. This statement is made with less hesitation because

the author freely admits that he has himself been guilty of such error in more than one instance. But a procedure should not be condemned because failure attends its unwise or faulty application. For a number of years the author has done no operation upon *hypertrophied* valves and consequently has resorted to surgery for the relief of valvular obstruction much less frequently than formerly. But when cases have been encountered presenting the valves in a condition of *fibrosis*, operation has been uniformly advised and employed with no failure, so far as known, to record. In the latter class of cases the author's experience justifies him in pronouncing the operation one of great value when properly performed in wisely selected cases.

Miscellaneous Methods of Treatment.—**Enemata** are useful in the treatment of constipation in much the same sense as purgatives, and their proper field of application is about as limited. When the rectum



Fig. 46.—Gant's valve clip and applicator.

and colon are loaded with costive feces the injection of water for the purpose of evacuating it is to be preferred to the exhibition of purgatives for the reason that traumatism is less likely to result from the passage. In emergency cases also, where time is an important consideration, the enema has the advantage. But for the treatment of the cause from which the costive condition results the enema is to be classed with purgatives as an agent of mischief. When habitually resorted to, large quantities of water are required to bring results and the frequent injection of such amounts necessarily weakens the gut by reason of the repeated overdistention. Moreover, sluggishness of the bowel is encouraged until ultimately colonic peristalsis is practically suspended and the mechanical lavage becomes an established necessity. In reality, therefore, the enema is not entitled to be classed as a method of treating constipation, since it is wholly incapable of removing the cause upon which the trouble depends, and is capable, when regularly used, of doing great and permanent harm.

It is not to be inferred from the foregoing condemnation that the enema possesses no virtues. On the contrary, it is the only non-surgical

means available for making topical applications to the upper portions of the colon, and in addition is most useful in certain cases as the means of administering nutriment and constitutional medication.

Suppositories designed to produce fecal evacuations, as a rule, are composed of glycerin or glycerin and soap, and act solely by virtue of their irritant properties. Often employed, they are apt to cause congestion and inflammation of the rectal mucosa and are consequently to be condemned for regular use. Like the enema and purgative medicines, they are only to be thought of in connection with the costive condition.

Massage.—This is one of the most valuable auxiliary methods of treatment. It is of the greatest benefit in stimulating peristalsis and restoring tone to the muscular coat of the bowel, and, intelligently employed, will be found a most useful adjuvant to other methods of treatment. In the case of infants and young children it is of special service for the reason that their abdominal walls are less resistant and effective manipulations can be more readily made. In such cases it often proves the only treatment required both for the immediate occasion and, if systematically employed, for effecting a permanent cure.

In administering massage the course of the colon should be closely followed from right to left, the amount of pressure being regulated by the degree of resistance offered. The patient should always be in the recumbent position when undergoing treatment so that the abdominal muscles may be completely relaxed. Ordinarily a treatment should consume about ten minutes and be repeated several times a week.

It is impossible for a patient to carry out this treatment for himself, the necessary effort being unavoidably attended by greater or less contraction of the abdominal muscles, thus preventing the pressure from reaching the parts desired. The difficulty may be overcome, however, by having the patient roll a ball weighing five or six pounds over the course indicated. The ball should be covered with flannel or chamois skin to avoid chilling the surface, and the manipulation should be repeated a number of times at one-minute intervals.

The various forms of mechanical vibrators which have come into use in recent years offer a ready and effective means for applying this treatment. In addition to the abdominal massage, many of these instruments are provided with special attachments for applying the vibratory force directly to the rectum and sigmoid,—a distinct advantage according to the statements of those who have employed them.

Electricity is of value in the treatment of constipation by virtue of its power to increase secretion and stimulate peristalsis. Whether the beneficial effect is transient or permanent, and whether it is due to some inherent quality of the electricity or merely to its action upon the

nerve-mechanism of the parts, are questions in regard to which very different views are held. It seems quite certain, however, that benefit is derived from this source in many cases,—which is a matter of greater importance than to understand exactly how and why.

The usual method of employing the electricity is by introducing one pole, generally the positive, into the rectum or sigmoid and completing the circuit by applying the other pole over the course of the colon or to the lumbar and sacral regions of the spine.

Murray,⁴ of Syracuse, recommends that the rectal electrode be connected with the delivery tube of an irrigator containing normal salt solution so that the current will be transmitted by the fluids, thus giving an electric enema, as it were. He uses the galvanic current and claims great benefit from the treatment.



Fig. 47.—Hirschman's air-massage apparatus.

Like massage, electricity is to be regarded as merely an adjuvant to other methods of treatment. In view of the fact that it is harmless when properly used, it is worthy of a trial in obstinate cases.

Air Dilatation.—It is a common observation with those who practise proctoscopy that the expulsion of the air following withdrawal of the instrument is accompanied by a fecal movement. This is due to the distention of the bowel incident to the inflation, which in reality is nothing more than a form of internal massage. Various writers have called attention to the phenomenon and some have recommended that, even in the absence of other pathology, the proctoscope be employed for this purpose. Obviously, if used with such design, the pneumatic proctoscope should be the instrument of choice.

Carrying out this principle, Hirschman, of Detroit, in a paper read before the American Proctologic Society in 1906,⁵ suggests the use of a thin-rubber bag attached to the end of a Wales•bougie, which is inserted

⁴ N. Y. Med. Journal, Nov. 3, 1906.

⁵ "Air Dilatation in the Treatment of Constipation."

into the sigmoid and alternately inflated and deflated at a few seconds' interval for a period of five minutes (Fig. 47). It is then moderately inflated and slowly withdrawn in this condition, thus gently distending the entire rectum and finally the sphincter. He reports permanent good results from this line of treatment in some 80 cases, with only 2 failures.

Tampons.—Applying the same principle of internal massage, tampons of cotton, wool, or gauze have been introduced into the rectum and sigmoid for the purpose of promoting evacuations. Here, in addition to distention, some degree of irritation of the mucosa would necessarily be produced by the foreign bodies, and consequently, even if as effective as claimed, their use as a regular method of treatment would scarcely be advisable.

This chapter cannot be more fittingly closed than by reference to the recent brilliant writings of Mr. W. Arbuthnot Lane, of London, on the subject. In a most interesting monograph entitled "The Operative Treatment of Chronic Constipation,"⁶ the author approaches the subject by deploring the inadequacy of medical terminology and defining the scope of the treatise in the following introductory paragraph:—

"The term 'chronic constipation,' as generally used, does not include all the conditions which I intend it should here. These conditions are the consequences of the accumulation of material in the intestinal tract for a period sufficiently in excess of the normal to produce, on the one hand, alteration in the gastrointestinal tract and in other viscera, and, on the other hand, toxic changes from absorption. While in the large majority of cases the patient suffers from constipation in the ordinary acceptance of the word, associated with very infrequent hard motions, in a fair number there is a daily action, and in a small proportion the motions are loose and frequent. The last feature is particularly the case when the dilated and obstructed colon has been infected by organisms other than those that exist normally in it, with the occasional development of mucous, membranous and ulcerative colitis in their various forms. I thought of substituting 'chronic intestinal stasis' for 'chronic constipation,' but to this there are many objections. I am, therefore, retaining the title fully conscious that it is not sufficiently comprehensive, because I do not know a better one to describe the pathological sequence to which I wish to call attention."

In this larger sense in which Mr. Lane employs the term, the two chief factors concerned in the production and maintenance of chronic constipation are enteroptosis and acquired mesenteries, or adhesions.

⁶ London: James Nisbit & Co., Ltd., 1909.

"These adhesions," it is held, "do not result from inflammation, but are developed to oppose the displacement of viscera, the tendency to which exists whenever the erect posture of the trunk is assumed." The author then proceeds to describe these structures in detail and to discuss the mechanics and consequences of the resulting defective drainage. According to his teaching,—and the arguments he advances are cogent and logical,—a proper conception of the diseases of the appendix, gall-bladder, stomach, duodenum, pancreas, kidneys, ovaries, etc., in many cases requires that they be regarded as sequelæ of chronic constipation. Among the secondary effects, due to the absorption of toxic material, he includes anemia, indigestion, degenerative changes in the heart and blood-vessels, muscular wasting, pigmentation of the skin, headache, mental depression, etc.

In the treatment of the condition Mr. Lane thinks that mechanical support properly applied is of the greatest value, particularly in the more recent cases before secondary involvement of extracolonic viscera and general toxic degenerations have occurred. When non-operative measures, medical and mechanical, fail he advocates resort to surgery. Briefly summarized, his views as to the surgical treatment are:—

In the milder type of case abdominal section with the simple division of all constricting bands and adhesions and careful subsequent attention to the bowel function may prove effective.

In the severer cases more radical surgery is required. This consists in dividing the ileum three to five inches from its junction with the cecum and anastomosing the proximal end with the sigmoid or upper rectum, thus short-circuiting the fecal current and eliminating the possibility of further toxic absorption.

When pain is a prominent feature it may be necessary, in order to afford complete and permanent relief, to remove the colon in part or in whole. This is best undertaken in two stages, the ileosigmoid anastomosis being first made, and, if the pain persists in such degree as to justify it, the colon being excised at a later date.

The above is a radical, not to say revolutionary, view of the subject. Whether it be ultimately accepted or not, it certainly contains much of truth and practical value, and cannot fail to stimulate further investigation of the vexed problem.

CHAPTER IV.

Fecal Impaction.

WHEN from any of the causes enumerated in the preceding chapter the bowel function is sluggish or careless habits prevail with reference to the act of defecation, the feces may become arrested and dammed up in any part of the large intestine, forming a mass which cannot be voided by natural effort. This condition is known as *fecal impaction*, or coprostasis, and may be considered as merely an exaggerated phase of constipation. The impacted mass is usually of ovoid shape, clayey or dough-like consistence, and may be of enormous proportions.

In the large majority of cases such accumulations are found in the pouch of the rectum, though they may occur in any part of the large bowel, the sigmoid flexure and cecum being the next most frequent sites. In a series of 46 cases reported by Gant¹ the impaction was located in the rectum 31 times, sigmoid 6, sigmoid and rectum 5, colon sigmoid and rectum 1, descending colon 1, transverse colon 1, and cecum 1. The cases involving both the rectum and the sigmoid may be fairly assumed to have originated in the former, which would make the rectum the site of the accumulation in 78 per cent. of the series,—a sufficiently accurate statement of the relative frequency with which this organ is found to be the seat of the trouble in all series.

The extent and size of the accumulation are sometimes astonishingly large. Beginning in the rectal ampulla the mass may be gradually added to by a process of accretion from above, until not only the rectum but the entire sigmoid and even the greater portion of the colon are occupied by it. In one of the cases reported by Gant the condition had been in existence three months and the collection when evacuated was found to weigh twelve pounds (Fig. 48).

Impaction may be met with at any age. Young children and the aged are especially liable to it, the former because of improper feeding and neglect, the latter because of weakened musculature and diminished secretion and sensibility. The author treated a case in a woman, 83 years of age, who was confined to bed with a fractured hip.

During the period of adult vigor women are more prone to this trouble than men because of the greater prevalence of constipation in the former sex. In the extremes of life, however, no such difference in the susceptibility of the sexes is to be noted.

¹ Diseases of Rectum and Anus, 2d edition, p. 115.

ETIOLOGY.

The various causes which produce constipation, as set forth in the preceding chapter, may also be regarded as causes of impaction. Of these, neglect, obstructive conditions of the rectum and colon, and painful lesions of the anal region are especially deserving of mention in this connection. In addition, certain special etiologic factors must be recog-



Fig. 48.—Impaction in rectal ampullæ of sigmoid (schematic).

nized, such as the long-continued taking of charcoal, bismuth, magnesia, and other mineral substances having a tendency to form concretions which often become the nucleus of the fecal mass; atony of the large bowel resulting from the overdistention of large and frequently repeated enemas, as well as that common to the aged, and a prolonged diet restricted to a single article of coarse food which leaves an abnormally bulky residue. The last factor was well exemplified in the Irish famine of 1846, in which potatoes constituted the only article of diet and the straits of hunger led the people to eat the parings and even the diseased

portions, with the result that impaction was of frequent occurrence. For a similar reason the trouble is said to be quite prevalent among the lower classes of Scotland, whose diet consists largely of a coarse quality of oatmeal. The pits of certain fruits, gall-stones, and scybala formed in diverticula or other recesses of the colon, may likewise be referred to as occasionally being the immediate causes of impaction.

Another special cause which is worthy of mention is the intestinal paresis due to inflammatory lesions involving the peritoneum. This is not infrequently encountered in mild degree as a postoperative complication in abdominal surgery and, unless recognized and properly met, may lead to serious consequences.

SYMPTOMS.

Cessation of the normal fecal discharge and the other ordinary symptoms of constipation are present also in impaction. In addition one or more symptoms peculiar to the latter condition may usually be elicited on careful inquiry. Named in the order of their frequency the symptoms which may be considered distinctive of impaction located in the rectum are: (1) diarrhea; (2) partial obstruction; (3) symptoms due to mechanical pressure; (4) irritable sphincter.

1. *Diarrhea*.—To class diarrhea as a symptom of impaction at first glance appears contradictory. Yet the true nature of the case is often strongly indicated by this symptom. The diarrhea is of a spurious form and is explained by the increased secretion due to the local irritation excited by the fecal mass. The discharges consist of fecal (sometimes blood-) stained mucus of a fetid odor, usually accompanied by considerable gas, and may be so abundant as to keep up constant tenesmus. Impaction should always be suspected in cases of constipation in which this nagging type of diarrhea suddenly supervenes without other adequate cause to account for it.

2. *Partial obstruction* is always present in impaction, but rarely becomes total unless the condition is complicated by a stricture, tumor, or other organic lesion of the bowel itself. The evidences of obstruction are those ordinarily encountered, viz., abdominal tympany and distention, tenderness, colicky pains, eructations, nausea, etc. The colon is sometimes dilated to enormous proportions in these cases and complete atony may result, especially in old patients.

3. The symptoms due to *mechanical pressure* may be local or reflex. Any of the pelvic organs may be deranged by direct pressure, giving rise to uterine or ovarian neuralgia, irritable bladder, etc. A sensation of fullness and weight in the pelvis is usually present, with prolonged

and oftentimes violent efforts at expulsion. Pain of a dull, achy character is constantly felt in the rectum, and may be referred to the sacral region, down the lower extremities, or to other remote parts.

4. *Irritability of the external sphincter* is not a distinctive symptom of impaction, but is present in a large proportion of cases when the accumulation is located in the rectum. The explanation of this phenomenon seems to lie in the repeated, forcible, involuntary contractions of the muscle excited by the straining efforts above referred to. A condition very closely analogous to true sphincter spasm is met with under these circumstances. Permanent hypertrophy would doubtless often result were it not prevented by the divulsion or division of the muscle incident to the treatment of the impaction.

It is in this extreme type of constipation that nervous and mental derangements are most likely to be encountered. In children choreiform manifestations and even convulsions have been noted, while in adults melancholia and suicidal tendencies are not infrequent.

Anemia, headache, anorexia, and other consequences of intestinal toxemia, as a rule, are present in these cases, and marked disturbance of the cardiac and respiratory functions are by no means rare. In cases of long standing loss of weight and great muscular weakness are likely to be observed, such cases in their constitutional aspects often simulating malignant disease or other vital malady.

Any pre-existing lesions in the rectum or colon are, of course, aggravated by a fecal impaction, and when none such previously existed they are likely to be produced by it. Proctitis and ulceration are the lesions which may be said to habitually follow in the train of impaction.

DIAGNOSIS.

The diagnosis of fecal impaction, as a rule, is not difficult. When the accumulation occurs in the rectum or sigmoid, digital examination and the use of the proctoscope are generally sufficient to determine the nature of the trouble. When the collection takes place in the higher portions of the colon, however, the diagnosis is not so simple. In these cases the site of the mass can usually be determined by careful abdominal palpation, and its character by excluding other possible forms of pathology. In the author's experience the vast majority of cases of impaction occur in persons with thin abdominal parietes, in whom the characteristic doughy feel of the mass can be readily detected. When this is possible, the diagnosis is at once relieved of embarrassment.

The history and symptoms of a case are often such as to strongly indicate its true nature; but the conscientious physician will refuse,

in this as in other diseases, to be satisfied with anything less than a thorough physical examination. It would be of little avail either to patient or physician for the fact of an impaction to be correctly surmised and the existence of a possible carcinoma which caused it to remain undiscovered. Because of the similarity of symptoms fecal impaction may readily be mistaken for carcinoma, and *vice versa*. In one instance occurring in the author's practice the physician who brought the patient for a radical operation for cancer was both incredulous and indignant when, after a mere digital examination, the positive diagnosis of impaction was announced. Operation the following day confirmed the diagnosis, but, strange to say, did not lessen the physician's indignation.

This is by no means a unique example of error in diagnosis. Fecal masses have been mistaken for tumors of practically every organ of the abdomen and pelvis and major operations contemplated and undertaken for their removal. When we remember that in more than 90 per cent. of all cases the rectum and sigmoid are the parts involved and that these organs are perfectly accessible for examination, it would appear that failure to diagnose these cases correctly must often be due to other causes than the inherent difficulties they present.

TREATMENT.

It is sometimes of as much importance in treatment to know what *not* to do as to know what to do. The necessity of withholding purgatives in the treatment of fecal impaction is a pertinent illustration of this truth. Given a history which begins with suspension of the normal bowel function and includes other concomitant symptoms of ordinary constipation, the temptation is always strong to order a full dose of some favorite purgative. Such a course is wholly irrational, and to follow it indiscriminately is to court disaster. In the case of impaction the size of the mass usually precludes the possibility of its expulsion by natural effort, and the only result of the active peristalsis excited by a purgative would be to greatly enhance the patient's discomfort and at the same time expose him to an unnecessary element of danger.

When the impaction is of recent occurrence it is often possible to break up and remove the mass by means of irrigations, and, unless the symptoms are urgent, this method should be tried in all cases. Copious injections of warm soapsuds alone are sometimes efficacious, but the addition of glycerin, or glycerin and oxgall, renders them more so. An eligible combination is:—

R Glycerin	℥iv.
Ox-gall (inspissated)	℥ij.
Soapsuds (made from Castile soap)	℥viij.

This to be injected and retained as long as possible, and the injection repeated at intervals of four or five hours. On the second day, if the patient's condition is good, peristalsis may be gently stimulated by the administration of a small dose of castor oil (1 or 2 drams) or some mild laxative mineral water, and the rectum filled with warm olive oil when the desire to stool becomes active.

Another agent which the author regards of special value for breaking up the impacted mass is peroxide of hydrogen. This may be used either pure or mixed with an equal quantity of tepid water, 2 or 3 ounces at a time being thrown into the bowel and retained as long as possible. When the mass is accessible for the purpose, the desired result will be hastened if the injection is also made *into* it at several places by means of a long, pointed syringe-nozzle. After several such injections have

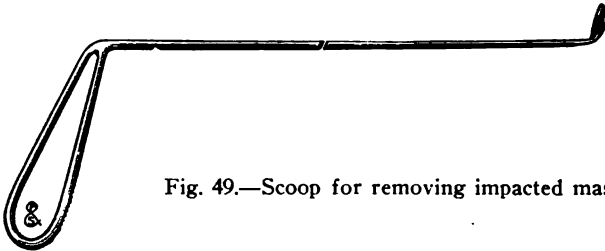


Fig. 49.—Scoop for removing impacted mass.

been made in the course of twenty-four hours, it will usually be found that the mass is more or less disintegrated and can readily be washed away with ordinary irrigations. The peroxide seems to act by virtue of its tendency to liberate oxygen when brought in contact with the organic matter, the fecal mass being in this way gradually softened and broken up. Contrary to what might be supposed, it is only mildly irritant unless an impure or too acid preparation is used. The author has treated a number of cases by this method with uniformly satisfactory results, and does not hesitate to recommend its use when the accumulation is found in the rectum or sigmoid.

When the above-mentioned methods have been faithfully tried without success, the mass must be attacked by mechanical means. Various special scoops (Fig. 49) and forceps have been designed for the purpose, but a strong, dull, uterine curette and a pair of ordinary placenta forceps will be found to serve equally well; or, in the absence of these, the handle of a long kitchen-spoon will prove an efficient substitute.

As a general rule, when it is found necessary to resort to instruments, it is best to administer a general anesthetic and completely divulse the sphincter, thus affording ready access and enabling the work to be

done more expeditiously and with less danger of inflicting traumatism. The operation will be further facilitated by introducing retractors or a large-sized bivalve speculum, and steadying the mass by grasping it with a long-handled tenaculum or volsella forceps. In female patients the mass may sometimes be brought into view and held securely while being broken up by means of two fingers introduced into the vagina, without the aid of instruments.

When the impaction has been cleared away the rectum should be irrigated with warm boric acid or normal salt solution and any lesions of the mucosa appropriately treated. During the subsequent treatment the bowel contents should be kept soluble and each movement for a few days preceded by the injection of an ounce or two of olive oil.

As a rule, these patients will require tonics both to meet the general indications and to overcome the intestinal atony. Some preparation of iron with *nux vomica* and *cascara* will be found a useful combination, *e.g.*:—

℞ *Pil. ferri carbonatis* 3j.
Ext. nucis vom. gr. iv.
Cascarinæ gr. x.
M. et ft. cap. no. xx.
Sig.: Take 1 after each meal.

Of course, when the immediate trouble and its sequelæ have been relieved, the patient should receive appropriate instructions designed to prevent a recurrence. Above all, he should be impressed with the necessity of securing adequate daily evacuations of the bowels, laxative enemas, etc., being resorted to for the purpose until the function can be restored to normal.

It is scarcely necessary to say in this connection that when the cause of the impaction is found to be an organic stricture, new growth, or other obstructive lesion of the gut itself, it should receive attention at the time of the primary operation, if the patient's condition will permit; otherwise, the case should be kept under close observation and the proper measures instituted as soon as the circumstances will justify.

When the impaction is located in the sigmoid flexure or upper portions of the colon a different and more serious problem presents itself. Here the mass is not accessible for removal by mechanical means, and irrigations in conjunction with abdominal massage must be relied upon. The same character of solutions as above referred to are indicated in these cases, and should be carried directly to the

part involved by means of the Wales bougie or colon tube. The injections should be repeated two or three times in twenty-four hours, between which careful massage of the mass should be practised. In subjects with thin abdominal walls, great assistance may be expected from the external manipulation, it being possible occasionally to break up and dislodge the mass by this means.

When this line of treatment fails, the only recourse is abdominal section and removal of the mass by free incision of the bowel. Fortunately this is not often demanded; but when, after persistent use of the massage and irrigations, it is apparent that they will not prove successful, the patient should be given the benefit of the radical operation while he has the strength to withstand it.

The sudden onset of total obstruction or rapid and dangerous prostration of the patient may make it necessary in exceptional cases to resort to colostomy for temporary relief. In such cases the site of the operation is determined by the location of the impaction, the obvious necessity of opening the bowel proximal to the obstructing mass being the only consideration.

CHAPTER V.

Pruritus Ani.

IN spite of the widespread prevalence of the affection and the vast amount of literature pertaining to it, pruritus remains the subject of no little confusion and contention, one of the few familiar disorders which refuses to lend itself to exact classification. The difficulty consists in the different standpoints from which it is considered, and the conflicting views which result may be divided into two groups: 1st, that pruritus is a separate and distinct disease; 2d, that it is merely a symptom of some other disease. Dermatologists, as a class, support the first-mentioned theory, though their teaching is by no means uniform upon the subject.

Van Harlingen¹ says: "Pruritus is a functional cutaneous affection manifesting itself solely by the sensation of itching"; and, again, "Pruritus, it must be remembered, is a distinct affection."

Shoemaker² adopts the name "paresthesia" and says: "Paresthesia is a distinct affection, not to be confounded with prurigo, or with any other of the diseases with which abnormal sensations of the skin are associated."

Crocker³ gives this concise definition: "A functional defect of innervation in which itching is the only direct symptom." While this language is somewhat evasive, the implication is plain that the author regards the complaint as a separate entity, and this interpretation is certainly borne out by the context.

Duhring⁴ says: "Pruritus stands forth a prominent and distinct affection."

Hyde⁵ defines his position on the question by remarking: "Hebra was the first to recognize the independent character of the disease here considered."

Jackson⁶ regards it as "functional neurosis of the skin."

Mracek⁷ evades the issue, simply saying by way of introduction:

¹ Handbook of Skin Diseases, 3d edition, p. 470.

² Diseases of the Skin, 4th edition, p. 696.

³ Diseases of the Skin, 3d edition, p. 717.

⁴ Practical Treatise on Diseases of the Skin, 3d edition, p. 579.

⁵ Diseases of the Skin, 4th edition, p. 696.

⁶ Diseases of the Skin, 4th edition, p. 447.

⁷ Diseases of the Skin, p. 118.

PLATE VIII.



Pruritus ani.

"It is our purpose, however, to consider here the classes (of skin diseases) which belong strictly to the neurotic class."

Malcolm Morris⁸ says: "Pruritus is itching without any visible cause to assign for it. It is a true sensory neurosis due to some functional disorder of the related nerves independently of any source of irritation on the surface."

On the contrary, Walker⁹ advocates the symptom theory in most emphatic and unequivocal terms: "Pruritus must be carefully distinguished from prurigo, a distinct affection." And again, "In the pathological classification of disease (Unna's) which I propose to follow as closely as possible, there is no place for a purely sensory disturbance."

Almost without exception the authors who treat of the affection as encountered in special localities (pruritus ani, pruritus vulvæ, etc.), and who raise the issue at all, array themselves, with Walker, upon the symptom side of the question.

Mathews¹⁰ is a notable exception. In a somewhat protracted discussion of the subject he argues that, while in many cases the inception of pruritus ani may be traceable to local pathology, instances are met with in which it must be regarded as a distinct and independent disease (pruritus ani essentialis).

As opposed to this teaching, Tuttle¹¹ opens his chapter on the subject with the emphatic declaration: "Pruritus ani is a symptom and not a disease."

The word *pruritus* means *itching*, neither more nor less; and, unlike many terms with which medical nomenclature is burdened, it fits with singular aptness the condition to which it is applied. But it is scarcely conceivable that a mere perverted sensation could be seriously considered a disease of itself. Strictly speaking, a disease is a pathologic process, a reality, whether recognized by the patient or not. Itching is a purely subjective phenomenon, having no existence apart from the intelligence which apprehends it. With equal reason it might be said in a case of typhoid fever that the pain, or the abnormal temperature, or the delirium constitutes the disease. But, while from an etymologic standpoint no other conclusion is possible, it is yet desirable to retain the term. To the patient at least, the itching is the biggest fact connected with his case; and, furthermore, there are very generally certain structural changes involving the af-

⁸ Diseases of the Skin, new edition, p. 64.

⁹ Introduction to Diseases of the Skin, p. 25.

¹⁰ Diseases of the Rectum, 2d edition, pp. 494 *et seq.*

¹¹ Diseases of Anus, Rectum, and Pelvic Colon, p. 568.

fectured area in these cases sufficiently pronounced to call for a special designation. Let us employ the term, however, with the clear understanding that we do so as a matter of convenience; that we recognize the associated structural changes as secondary and incidental, and that we refuse to countenance the absurd idea that a symptom can under any circumstances be properly considered as a disease.

Pruritus ani is met with chiefly in adult life, though it is occasionally encountered even in very young subjects, in whom threadworms (*oxyurides*) are the usual cause. Men are more frequently the victims than women; and, while social conditions furnish no barriers, the complaint shows a particular predilection for the higher walks of life, where the seductions of the table are habitually yielded to. Those who lead sedentary lives are most often affected and, as a class, the corpulent rather than the thin. Climate and season apparently exert no influence, further than that warm weather promotes perspiration and so may be considered an indirect factor. Basing the observation upon the author's personal experience, it may be said that blondes are more often the subjects of the malady than brunettes. This statement is probably very generally true, since the more delicate texture of the skin of blondes would naturally render them more susceptible. It is worthy of remark, also, as a personal observation, that pruritus is rarely associated with hysteria and other recognized neuroses.

ETIOLOGY.

Pruritus ani is one of those well-sounding expressions which in the past has served chiefly as a cloak for professional ignorance. It is an easy matter and creates a good impression to meet the complaints of a tortured patient with a wise look and the glib assurance that he has "pruritus ani." If the term were literally translated for him, however, the effect would scarcely be so pleasing. As well tell a patient who seek relief from a headache that he has cephalalgia. If there is any one item of knowledge of which the average sufferer from this trouble is profoundly aware, it is that a certain particular portion of his anatomy *itches*. The thing of first importance is to recognize that pruritus, like every other symptom, always has a cause, and then make every effort to discover it. This is oftentimes far from a simple matter. But it is more rational, in the rare cases which baffle painstaking investigation, to attribute failure to our own limitations than to invent a separate and unscientific class to fit them.

The causes of pruritus may be classified under three heads: local, constitutional, and reflex.

Local Causes.—The particular site at which pruritus manifests itself is doubtless always determined by some purely local factor or condition. In this sense every case of pruritus ani may be said to have one or more local causes. Of these, lack of cleanliness, congestion, and pathologic discharges are deserving of special mention. The anatomy and physiology of the parts are such that more than ordinary care is required to maintain their cleanliness, and many who are otherwise scrupulous in their personal habits are apt to be negligent and careless in this respect. The result is that particles of fecal matter retained for a long time in contact with the perianal tissues are likely to induce a certain amount of irritation, often, indeed, sufficient to involve the nerve-endings and thus prove directly causative of the trouble.

Congestion and pathologic discharges represent general or underlying conditions. In seeking for the specific cause in a given case it is at once evident that no local pathology is to be reckoned inconsiderable, since practically every disease of the rectum and anus is attended by one or the other, not infrequently, in fact, by both of these conditions.

Hemorrhoids, fissure, proctitis, ulceration, polypi, stricture, cancer, foreign bodies, prolapse, cryptitis,—in short, any lesion of the anus or rectum may act as exciting cause by reason of the chronic congestion or discharge which accompanies it. Deserving of special mention in this connection are constipation as the most frequent cause of local congestion, and catarrhal disease of the large bowel as the most frequent cause of irritating discharges.

In addition to these well-known diseases, thread-worms may again be mentioned as a cause of pruritus ani, acting perhaps not so much by their movements, as has been taught, but rather indirectly, through the catarrhal inflammation which they excite. In young patients especially the possibility of this cause should always be borne in mind.

Certain true diseases of the skin which are marked by the symptom of itching may be encountered in the circumanal region, such as eczema, herpes, erythema, eczema marginatum, pediculi, etc. These are often referred to as local causes of pruritus, but, in the author's opinion, are more properly to be regarded as separate diseases and their description left to works on dermatology. Skin diseases in this region present much the same characteristics as in other localities, and are to be carefully distinguished from the purely secondary changes in the perianal integument so often seen in chronic cases of pruritus ani as the result of scratching.

Constitutional Causes.—Various constitutional diseases have from time to time been assigned as causes of this complaint, and most ingenious and diverting arguments advanced in support of such theories. In most cases the connection has doubtless been more fancied than real, due rather to the perplexity and desperation of the seekers for a cause than to any demonstrable relation. Yet it is true that pruritus has been found associated with certain general disturbances so frequently as to warrant regarding them as real causative agents in many cases. For the most part such disturbances involve primarily the digestive apparatus, though diabetes, nephritis, gout, rheumatism, and hepatic disorders should also be mentioned. Of all constitutional causes intestinal fermentation, with its accompanying flatulence, constipation, and catarrhal inflammation, is by far the most frequent. This fact is deserving of special emphasis. So often has the author noted this condition in cases of pruritus ani, and so often have his efforts to relieve the latter resulted in failure and disappointment until the former received attention, that when the existence of the intestinal disorder is determined he regards its proper management the most important indication of the case.

Certain articles of diet often seem to act as exciting causes in persons predisposed to pruritus. Shellfish, strawberries, highly seasoned food, alcoholic beverages, tea, coffee, and excessive smoking have all been known to light up acute attacks.

Constipation should also be noted as a frequent cause, both for the reason that it incites and maintains local congestion, and because it is so often a prominent expression of liver and digestive disturbance.

With reference to constitutional causes in general, it is of the first importance to remember that the primary, underlying cause of pruritus may be of this character, and that any local pathology discovered may be purely secondary or incidental. Failure to recognize such possibility with respect to every case is doubtless the true explanation of the lamentable frequency with which the affection is pronounced irremediable.

Reflex Causes.—When thorough investigation of the general and local conditions fails to clear up the etiology of a case, the fact must not be lost sight of that pruritus ani may in exceptional instances be of reflex origin. In such cases the genitourinary organs are most often at fault, as might be inferred from their contiguity to the rectum, and especially from their intimate anatomic relationship with it. For the most part the diseases which give rise to the reflex expression are chronic in character, such as urethral stricture, hypertrophied prostate, seminal vesiculitis, etc., and in the female long-standing affections of the vulva, vagina, and uterus.

Cases of this kind are undoubtedly extremely rare, but they do occur, and a most brilliant cure will occasionally reward care and alertness with respect to this particular class of causes.

In discussing reflex causes Tuttle¹² states that such relation may sometimes be observed between gall-stones and pruritus ani. That the two are often associated cannot be gainsaid. But the more reasonable explanation of their relation would seem to lie in the direct vascular connection between the parts involved and the congestion of the portal vein and its radicles occasioned by the liver disease.

PHYSICAL CHARACTERISTICS.

In the beginning there are no changes to mark the presence of the pruritus. The appearance of the parts usually seen in old cases, and with singular uniformity described by authors as characteristic, is properly attributable to the damage inflicted by the patient in scratching, *not* to the pruritus itself. This fact calls for special emphasis, as much of the confusion which exists upon the subject is unquestionably due to lack of discrimination on this point. The author believes and ventures to assert that, if the parts could be kept *dry* and *clean* and the patient induced to entirely refrain from *scratching*, the local changes usually denominated "characteristic" would be chiefly conspicuous for their absence. In fact, it is a matter of common observation that when a case is seen early and the patient proves tractable, alterations in the appearance of the affected parts occur only in minor degree.

It is true, however, that the peculiar local condition ordinarily referred to as typical is rarely absent in cases of long standing, though the form and extent of the changes may vary within wide limits. It may consist merely of a narrow zone of thickened integument encircling the anus, dead white in color from loss of the natural pigment,—the so-called parchment skin. In other cases the area affected may be so extensive as to involve the perineum and scrotum or vulva anteriorly, and reach well out over the buttocks and sacrum. In the majority of cases patients complain especially of the perineal raphé and the postanal furrow, which seem to be favorite sites of attack. The surface involved usually extends well up into the anal canal and the radiating folds are elevated, sodden, and edematous, often concealing minute ulcerated cracks or fissures between them. In many instances the whole area presents a moist, excoriated appearance, causing it to resemble very closely some form of eczema. In differentiating the condition from the various skin diseases the history of the case furnishes the key, though, apart from

¹² *Op. cit.*, p. 574.

the history, the peculiar appearance once recognized is easy of identification.

SYMPTOMS.

The symptom which inaugurates the complaint and remains its most constant and conspicuous feature throughout is *itching*. In fact, it may be said that this is the only constant symptom of the affection. In the early stages the itching is not different in type from that which characterizes similar involvement of the cutaneous nerves of other parts, due to visible causes. Later on, certain well-marked differences may be noted, chief among which are the unremittent, everlasting persistence of the sensation, the fact that it is always greatly intensified at night when the victim gets warm in bed, and the further significant fact that scratching affords little or no relief. The local injury which the desperation of the patient leads him to inflict upon the parts is sometimes considerable. In such cases, burning, smarting, stinging, and even real pain may become added symptoms, with the result that the itching is not mitigated, but the suffering greatly enhanced.

Secondary impairment of the general health is often noted in these cases. Days of perpetual torment and nights of broken sleep and rest ultimately make their impress upon the strongest constitutions, not to mention narcotic drugs which all too often enter into the story. Neurasthenia, melancholia, and even insanity have been known to result, and threats of suicide are familiar to all who have the handling of many cases.

DIAGNOSIS.

In the whole field of proctology this is the only ailment in which a trustworthy diagnosis may be founded on the statements of the patient. But, as the cure of the patient rather than the name of the disease is the ultimate aim of diagnosis, careful, thorough physical examination is as necessary with reference to pruritus ani as in any other class of cases. The parts are easy of access and, as a rule, the nature of the local trouble may at once be determined on simple inspection. But this is only the first step in the diagnosis; here knowledge of the cause upon which the local condition depends is the matter of fundamental importance. Remembering the many and diverse factors which may enter into the etiology, the examination should include not only the rectum and sigmoid, but the adjacent pelvic structures and every several organ and function in the economy. For reasons that have been already mentioned the digestive apparatus and the genitourinary organs should receive special attention.

PROGNOSIS.

The prognosis will depend as much upon the physician as upon the condition he has to treat, perhaps more so. If he will adopt as a working basis the broad, sane view that pruritus ani is not primarily a disease, but merely a local manifestation of a pathology which can be determined, and act accordingly, no case will ever be hopeless. Still, in view of the essentially chronic nature of the trouble, prudence would dictate that in any given case the prognosis be a guarded one.

TREATMENT.

The view of pruritus ani which is here advocated, namely, that it is a symptom and not an essential disease, logically means with reference to treatment that the first requisite is the determination and removal of the cause. Not infrequently this is an extremely difficult matter, taxing both the patience and the ability of the physician to the limit. But the fact must be emphasized that relief afforded in any other way is palliative only. Perhaps the most frequent error in connection with the treatment consists in mistaking the secondary change in the skin of the parts involved either for the affection itself or at least for the cause of it. This is a perfectly natural mistake, particularly in cases of long standing. But, however radical and heroic the treatment applied on such hypothesis, it can result at most in nothing more than temporary benefit.

Another frequent error, and likewise a perfectly natural one, is to regard any rectal pathology discovered as the *necessary* cause of the pruritus. The rectal lesion may be the result of the same cause which produced the pruritus and bear only the relation of coincident existence to it. It has been the author's experience more than once to have the pruritus persist in as bad form as ever after radical operation for internal hemorrhoids, or the most thorough treatment of other local disease, and similar experiences have been reported by many others.

These preliminary observations are for the purpose of lending emphasis to the statement that success in the treatment of pruritus ani depends very largely upon a proper conception of its true nature. Here, as with respect to other diseases, the important thing to remember is that we have to do with a *patient* rather than with any single symptom or local condition.

In the management of a case of pruritus ani, then, our effort must be to restore the patient to as nearly a normal condition as possible, at the same time that we endeavor to promote his comfort by local measures

directed to the itching parts. The first-named object demands not only the correction of all sources of irritation in the rectum and neighboring organs and the proper treatment of any constitutional disease found present, but at the same time, and seemingly just as important, the correction of faulty habits of life, regulation of the diet, the promotion of rest and sleep, the judicious administration of tonics, etc., and in every case a studied attitude of hopefulness and encouragement as to the final outcome.

Assuming, now, that the general indications have been met, the important problem in the management of the local condition remains to be considered. No hard and fast rules for guidance here can be laid down. The local condition varies so greatly in different cases that the only rational plan is to carefully study each individual case and adapt the remedial measures to the special indications. Local applications properly selected and faithfully employed will prove successful in the great majority of instances, but occasionally the aid of surgery must be invoked before a perfect and permanent cure can be effected.

Local Applications.—A separate chapter would scarcely furnish the space necessary to record all the local measures which have been advocated for the relief of pruritus ani. The resources of therapeutics have been sadly taxed by the "favorite" remedies of many authors. The only result of an attempt to enumerate the list would probably be the bewilderment of the seeker for practical information. Instead, let us classify under separate headings the several indications for local treatment which may be encountered, specifying only those remedies which experience has shown to be the most generally useful.

Relief of the Itching.—This is always the most urgent indication: Antipruritic remedies, good, bad, and indifferent, are very numerous. One of the best is hot water, which not only relieves the symptoms, but by its tonic and cleansing action is genuinely curative. It is best applied immediately before retiring and, to be of greatest benefit, should be used as hot as can be borne and the application continued for not less than ten minutes.

Perhaps the most generally useful of the antipruritic remedies is carbolic acid. It may be used either as a lotion or ointment, the strength varying from 1 to 5 per cent., according to results. Other remedies of this class are camphor (2 to 4 per cent.), menthol (2 to 4 per cent.), chloral (3 to 6 per cent.), chloroform (5 to 10 per cent.), cocaine (2 to 10 per cent.), black wash (lotio nigra), etc. All of these agents will be found to act better if preceded by the hot water as first mentioned.

Soothing Applications.—Often the parts are so tender and inflamed that soothing and protecting applications are of as much impor-

tance as those designed primarily for the itching. This indication may be met by Goulard's cerate or lead acetate ointment (freshly made), belladonna ointment, calomel ointment (4 per cent.), oxide of zinc ointment, lead and opium wash, and similar remedies. When painful cracks or fissures are present it will usually be found advisable to paint them with a solution of silver nitrate (5 to 10 per cent.) so as to protect the raw surface with a coating of albuminate of silver before applying the soothing remedy. Protection of the parts from friction by having the patient wear a pledget of cotton or gauze is also an important item in this connection.

Stimulating Applications.—In cases of long standing where thickening and induration of the perianal integument have occurred, a preliminary course of treatment by means of stimulating application may be necessary to improve the circulation of the altered skin and restore its normal elasticity. For this purpose a variety of agents may be employed. One of the most useful is citrine ointment (ung. hydrarg. nitrat.), which may be applied pure or, when this is painful, reduced to proper strength by the addition of lanolin or zinc ointment. The ointment is best used at bedtime, and retained in close contact with the affected parts during the night by means of a T-bandage. It should be applied only to the diseased area, and repeated nightly until the desired effect is produced. Other remedies of this class are oil of cade (1 to 2 per cent.), balsam of Peru (10 per cent.), compound iodine ointment, ammoniated mercury ointment, and ichthyol ointment (10 to 20 per cent.). A solution of nitrate of silver (2 to 4 per cent.), painted over the parts daily and followed by a bland ointment, sometimes seems to accomplish the desired end more speedily than any other remedy. Solutions of bichloride of mercury (1 to 2 per cent.) and permanganate of potash ($\frac{1}{2}$ to 2 per cent.) used in the same way will also occasionally prove of value.

Caustics.—Not infrequently the stimulating applications above referred to will be found inadequate, and destruction of the altered skin with caustics become necessary. For this purpose such agents as Churchill's tincture of iodine, pure carbolic acid, and the saturated solution or solid stick of nitrate of silver may be resorted to. All of these agents are quite painful and obviously should not be employed without due consideration and a thorough understanding with the patient.

Dusting Powders may sometimes be employed with advantage, especially in obese subjects and in warm weather. Talc and stearate of zinc, by reason of their quality of adhesion, should constitute the bases of such remedies. Camphor (2 per cent.), calomel (5 to 10 per cent.), menthol (1 to 2 per cent.), salicylic acid (1 to 2 per cent.), carbolic acid

(1 per cent.), and other medicinal agents may be added according to the indications.

When the pruritus is due to or complicated by the constant exuding of discharges from the rectum, of course relief of the condition which causes the discharges is the first indication. This will be found to be of catarrhal character in most instances and for its relief Adler strongly recommends the following combination:—

R Ext. hamamelis fl. ʒj.
 Ext. ergotæ fl.,
 Ext. hydrastis fl.,
 Tr. benzoin. comp. āā ʒij.
 Ol. olivæ vel Ol. lini (carbolized 5 per cent.) ʒj.
 M. Sig.: Inject 2 drams into the rectum at bedtime.

This particular point will be found more fully discussed in the chapter on Proctitis.

The X-ray as a remedy for pruritus ani has been strongly endorsed by quite a number of observers. Pennington reported a series of

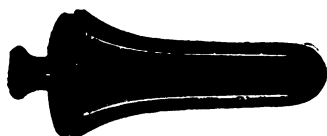


Fig. 50.—Allingham's bone plug.

successful cases to the American Proctologic Society a few years ago, laying particular stress upon the point that chronic cases presenting marked skin changes are the ones especially suitable for this form of treatment. In view of the obstinate and often intractable nature of the complaint, it is well to bear this agent in mind; but its application in this locality should be most carefully guarded, particularly in male subjects, as the danger of resultant sterility is said to be very great.

Dilatation of the Sphincters is a remedial measure of at least temporary value in many cases. Allingham's "bone plug" (Fig. 50) designed for this purpose consists of a nipple-shaped device about an inch and a half in length and a half-inch in diameter, with a shield at the end to prevent its slipping into the rectum. Inserted at bedtime and retained during the night, this instrument is said to afford marked relief. As stated by its celebrated inventor, "it appears that it benefits by exercising pressure upon the venous plexus and filaments of nerve close to the anus." Probably much more can be accomplished along this line by systematic dilatation with metal or hard-rubber instruments

of graduated sizes, used cold and retained for fifteen to thirty minutes each night immediately before retiring. The author is sure that this plan of treatment has proved of material benefit in his hands in promoting the comfort of patients, and perhaps also aiding in their cure.

SURGICAL TREATMENT.

The surgery of pruritus ani comprehends not only operations for the relief of coincident or causative anorectal lesions, but also and more particularly, certain procedures in which the pruritic area is directly attacked. With reference to the former it may be said in passing that, while it can never be determined in advance exactly what part is played by such coexistent lesions as hemorrhoids, fissure, fistula, etc., in the production of the pruritus, it is always to be presumed that their relation is etiologic. Consequently when such lesions are present they should first receive attention. Under these circumstances the operation indicated should be performed under general anesthesia so that the additional and important advantage of thorough divulsion of the sphincter may be gained. It is proper in this connection to again observe that too positive expectations and assurances should not be based upon operations of this kind. They are always indicated and will prove successful in the majority of cases; but the failures have been numerous enough, even in the hands of the most expert, to emphasize the advisability of a guarded prognosis in every case.

The various operative procedures upon the pruritic area itself may be divided into two classes: those which have for their object the destruction or removal of the altered skin, and those in which the severing of the nerves supplying the affected parts is undertaken. The surgical measures falling under the first class are two:—

1. Cauterization of the area involved with the actual cautery. This method is very popular with American surgeons, and has much to commend it. Owing to the fact, however, that it is difficult to limit the action of the cautery, it should be employed with great caution, the peculiar tendency of scar tissue resulting from burns to contract and produce deformity being always kept in mind. The result desired in the use of this agent is superficial destruction of the pathologic integument, not sloughing and ulceration. To this end the cautery iron should be brought only to a dull red heat, and lightly and rapidly passed over the diseased area, care being taken to see that it reaches the depths of all fissures and the creases between the edematous folds. The after-treatment should be carefully looked

after, strict cleanliness being observed and antiseptic dressings, preferably of an oily character, kept constantly applied.

2. Removal of the altered skin by radical dissection is a procedure of such severity and attended with so many obvious disadvantages that it can only be regarded as a *dernier ressort*. In fact, it is doubtful whether it may ever be considered justifiable, since even in the most extreme cases the same end may be attained by far less objectionable methods. As advocated by Mathews, the procedure consists in making a circular incision about the anus so as to embrace the affected area and resecting the enclosed skin well up into the anal canal. The healing of such a wound in this locality must of necessity be protracted and the probability of contraction very great. That the itching would be effectually done away with is probably true, but the dangers and disadvantages of the operation are such that only the most desperate and intractable case would warrant even considering it.

The second class of surgical procedures consists of those which are based upon the rational idea of disposing of the pathologic sensation by severing the nerves which transmit it. The first and most notable of these was devised by Sir Charles Ball and described by him as follows¹³ (Fig. 51): "The skin having been cleansed as completely as possible and shaved, a curved incision is made on each side of the affected area enclosing the entire ellipse with the exception of a narrow neck in front and behind; these incisions are carried down to the sphincter muscle, and the flaps raised by careful dissection with scissors from the surface of the muscle, round its anal margin, and up the anal canal to above the mucocutaneous junction, the dissection extending around the entire circumference, all connections with the subjacent tissues being divided. The pedicles in front and behind are now undercut to a point well beyond the area of irritation, and the outer, concave edges of the incision are also undercut to a distance of at least a quarter of an inch free of the involved skin all round. Care must next be taken to stop all bleeding, and the flaps should not be replaced until it is completely arrested, as the formation of a hematoma in the wound might compromise the vitality of the flaps. The flaps are finally replaced and retained by sutures, a few intervals being left between them for drainage." The immediate result of the operation is, of course, to render the area embraced by the elliptical incision superficially anesthetic. Should the pruritus recur after healing of the wound, this authority further suggests that removal of the posterior roots of the third and fourth sacral nerves with their

¹³ The British Medical Journal, January 21, 1905, p. 113.

ganglia should be seriously considered, just as in cases of trifacial neuralgia recurring after neurectomy the more radical operation of resection of the Gasserian ganglion must be resorted to.

T. C. Martin has proposed a modification of Ball's operation, which consists in leaving a strip of skin attached on each side, as well as in front and behind, and making the dissection subcutaneously, thus accomplishing the same end more expeditiously and with less mutilation.

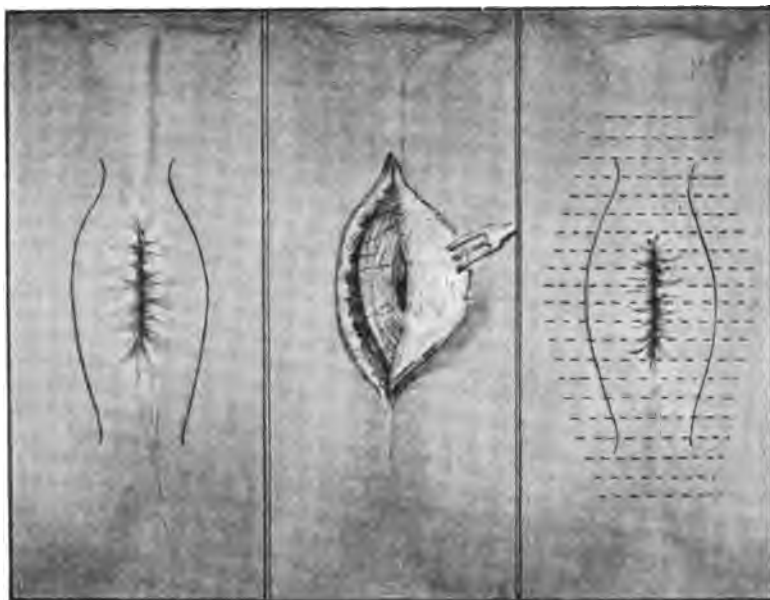


Fig. 51.—Ball's method. Incision for pruritus ani.

Hamilton, of Columbus, O., advocates the following operative procedure, which he states he has employed with unvarying success:¹⁴ incision of the perianal structures by straight cuts parallel with the radiating perianal folds, the incisions extending through the mucocutaneous and skin layers into the superficial fascia. The incision should extend as high up in the anal canal and as far out on the epidermis as the itching or alteration in the tissues appears. He advises that the posterior raphé, which is usually the site of the most annoying itching, be first incised and at the same time one of the anterolateral folds. In a few days one or two other folds may be similarly treated, and so on until the whole of the pruritic area has received attention. The

¹⁴ Ohio State Medical Journal, January, 1906.

work is carried out under local anesthesia, and no after-treatment of the wounds is required except to keep the edges of the incisions apart with dry gauze dressings. Hamilton ascribes the favorable effect of this plan of procedure to two factors: distention of the perineural tissues by the anesthetic fluid, and metabolic changes in the nerve-fibers involved, due to the granulation process.

The essential features in the successful management of a case of pruritus ani may be briefly summarized as follows:—

1. Recognition of the fact that the trouble may be of constitutional or reflex origin.

2. Determination and removal of the cause.

In the treatment of the local condition,

3. Cleanliness.

4. Protection of the parts from friction and irritations of all kinds.

5. Local applications according to the indications of the individual case, for the relief of the itching and the restoration of the altered skin to normal.

6. In exceptional cases destruction of the diseased skin with the chemical caustics, or

7. Surgical intervention.

Dr. Dwight H. Murray, of Syracuse, N. Y., in papers read before the American Proctologic Society at the sessions of 1911, 1912, and 1913, presents an entirely new view of the causation and treatment of this distressing affection. Having been repeatedly baffled, as every conscientious worker in this field has been, it occurred to him in 1910 to have a bacteriologic investigation made of a consecutive series of 19 cases, to determine if local infection might not prove to be a factor worth considering. The findings were strikingly uniform, streptococci being the only micro-organisms constantly present. Pure cultures of these were grown and autogenous vaccines made, with which each patient was injected in gradually increasing doses. The results were surprisingly prompt and satisfactory, the local condition rapidly improving and the itching as rapidly subsiding.

In the first two papers Dr. Murray reports a total of 32 cases, each of which was studied in a most systematic and thorough manner. In the 1912 contribution he gives in detail the technique followed in making the cultures and vaccines and in administering the latter, and closes by reiterating the conclusions announced in his first paper. These conclusions were as follows:—

- “1. From the data presented by this series of cases I feel justified in saying that pruritus ani is caused by an infection by or associated with one of the streptococci groups, which may be the primary, secondary,

or aggravating cause; if it is the secondary or aggravating cause, the primary may have already passed away.

"2. If technically for the bacteriologist, the streptococcus may not seem to be the primary cause of infection, practically to the patient and to the physician who treats him streptococcic infection answers best the question of etiology.

"3. Whether the infection occurs because the opsonins for streptococci are low, or whether the opsonins are lessened because of the invading organisms, is not yet known.

"4. If the opsonin test is low for *B. coli*, or any other bacteria, there may be a complicating infection.

"5. A vaccine made from a culture of the offending germs offers our best hope of cure.

"6. Whether any local treatment for temporary relief, while awaiting the results of vaccine treatment, is advisable or not, must be left to the judgment of the attending surgeon. Some of the cases herein detailed were treated only with autogenous vaccine, and results were as satisfactory as in those cases receiving topical treatment as well."

The painstaking care and attention to detail which characterizes Dr. Murray's investigations are commendable in the highest degree. While he admits recurrences and a few failures, his splendid work throws new light on a perplexing problem. The author considers it valuable and promising. If by means of the treatment indicated we are enabled to relieve only an occasional intractable case, the profession and the hapless victims alike will have abundant cause for gratitude.

CHAPTER VI.

Proctitis (Rectitis); Proctocolitis.

THE mucous membrane of the rectum, like that of other organs, is subject to various forms of catarrhal inflammation. Occurring either independently or in association with other diseases, this is probably the most frequently encountered of all rectal affections. It must be clearly understood, however, that the inflammatory process is not often definitely limited to the rectal mucosa. On the contrary, it may be stated as a general proposition that when a proctitis exists, the sigmoid, or both sigmoid and colon, is more than likely to be found similarly involved. Hence the term *proctocolitis* is, strictly speaking, the more accurate designation for the class of affections now under discussion.

Catarrhal inflammation of the lower bowel may be *acute* or *chronic*, *simple* or *specific*, the last-mentioned class including the *dysenteric*, *syphilitic*, *gonorrheal*, *erysipelatous*, and *diphtheritic* varieties, named in the order of the frequency with which they are observed. For purposes of description chronic proctocolitis may be subdivided into *hypertrophic* and *atrophic*, though these are to be regarded in many instances as sequelæ of the acute form rather than as distinct types of the affection.

SIMPLE ACUTE PROCTOCOLITIS.

Acute inflammation of the large bowel of non-specific origin is a very widespread affection, occurring at all ages and in all conditions of life. It resembles in every respect catarrhal inflammations of the pharynx and upper air-passages and, like them, would doubtless pursue a uniform, mild, self-limited course but for the modifying influence which the special function of the organ necessarily exerts. The inflammatory process may begin at any point in the rectum or colon, and extend in either or both directions, and usually expends itself on the mucosa, though the submucous tissues and even the muscular coat may be temporarily implicated. Permanent damage rarely results; and, while great suffering and, in neglected cases, prolonged invalidism may be induced, the danger to life is trifling.

Etiology.—While it is not possible, in the present state of our knowledge, to specify the particular varieties of micro-organisms, it is probable that simple catarrhal inflammation of the rectum and colon, like

that of other mucus-lined tracts, is due to bacterial invasion. But certain causes must be assumed to prepare the field and render it receptive before such invasion can take place; otherwise, since many forms of pathogenic bacteria are constantly lurking in the lower bowel, continuous infection and inflammation would be the natural results.

In a general sense acute proctitis of simple type may be said to be due to *irritation*. For the most part this is mechanical, and traumatism of one kind or another is the means by which it is excited. The most frequent cause under this head is constipation, or, rather, the resulting physical condition of the feces, costiveness. Although it is true that a certain degree of tolerance for solid matter is possessed by the lower portion of the colon and the rectum, it is obvious that such can be the case only within well-marked limits. Absorption of the soluble constituents of the feces continues in these portions, and the longer the fecal matter is retained, the larger, harder, and drier the mass becomes, and consequently the more likely to produce mechanical irritation. When the straining required to void such a stool and the abrupt diminution in the size of the bowel which takes place at the junction of the movable rectum and anal canal are remembered, it is a matter of some surprise that traumatic proctitis is not an invariable effect of the costive condition. When the fecal accumulation results in impaction, such effect is constantly seen, tenesmus and mucous discharges being among the most uniform and characteristic of the symptoms which mark this condition.

Acute indigestion and diarrhea, with their frequently repeated discharges of fermenting and irritative material, are very common causes of proctitis. The tenesmus which early becomes a distressing feature in these cases is merely the expression of this local complication. Epidemic dysentery is attended by the same class of phenomena, the resulting proctitis being one of its earliest and most prominent symptoms. The mycotic diarrheas ("summer complaint") of infants and young children are usually marked by a similar local involvement, which is responsible for no small part of the suffering of these little patients.

Pin-worms (oxyurides) and other foreign bodies often act as exciting causes. The former should always be suspected in children.

Prolapse and intussusception are practically always marked by inflammation of the mucosa of the parts involved. This is sometimes so acute as to result in extensive necrosis and ulceration. Friction of the apposed mucous surfaces and the traumatism due to the feces being forced through a contracted passageway are the chief etiologic factors in these cases.

In the same way, *i.e.*, by producing friction, polypi and other

neoplasms may be exciting causes. Some of the most inveterate cases may be traced to this source, the chief and, indeed, oftentimes the only symptom they present being the proctitis.

The frequent repetition of enemas, especially when self-administered, may light up an attack of proctitis. The impinging of the nozzle-tip against the mucosa and the force of the stream of water directed against the same circumscribed area time after time explain the initial injury, which may spread and become generalized. The after-effects of operations, carelessness in examinations, and rough and injudicious methods of treatment may also be mentioned.

Overpurgation is often responsible for this trouble. This is especially true when the agents employed are of the irritant or so-called "drastic" type, like scammony, gamboge, colocynth, etc., which so frequently enter into the composition of patent and proprietary pills. The inflammatory effect in such cases is due to the free outpouring of bile excited by these drugs as well as to the irritant qualities of the drugs themselves.

Pressure upon the rectum from without may cause proctitis by maintaining local congestion and by narrowing the lumen of the gut so as to produce friction and invite traumatism. The retrodisplaced uterus is the most common etiologic factor of this class, though any kind of pelvic neoplasm, stone in the bladder, the enlarged prostate gland, etc., may be the offending agent.

Acute congestion resulting from chilling of the parts by sitting on cold, damp seats is always referred to as a cause of proctitis by writers on the subject, the frequency of the complaint among cab-drivers being usually mentioned as an illustration. The author has never met with a case due to this cause, but is not disposed to deny the possibility of such occurrence.

Finally with reference to etiology, it may be said that most other forms of intrarectal pathology are accompanied by some degree of proctitis. Thus, simple and specific ulceration, fistulæ presenting openings on the mucous surface, stricture, carcinoma, etc., are uniformly marked by inflammation of the contiguous mucosa, the associate tenesmus being due as much to the inflammatory complication as to the lesions themselves. Internal hemorrhoids are usually included in this list; but a proctitis so caused is certainly rare and when observed is not often of a type to be called acute.

Symptoms.—When the attack is sudden and violent in onset it may give rise to considerable constitutional disturbance. Occasionally, especially in young subjects, the attack is ushered in with a chill followed by a febrile reaction, headache, furred tongue, etc. In such cases the

patients will complain of a sensation of heat, fullness and weight in the region of the pelvis, perhaps also throbbing pains in the rectum, and a constant and irresistible desire to resort to the commode. Aching over the sacrum, pains referred to the generative organs or down the lower extremities, and reflex disturbances of the bladder as evidenced by frequent and uncontrollable desire to micturate may be additional features. As a rule, however, the trouble develops more insidiously, the local discomfort and the futile and unsatisfactory efforts to obtain relief by going to stool being the earliest symptoms. The necessity of emptying the bowel seems to the patient imperative, and he makes the attempt with increasing frequency. The sensation is usually described as that of a rough or sharp foreign body in the rectum, and is due to the swollen and sensitive folds of mucous membrane. Tenesmus, the term applied to this group of phenomena, may be considered the distinctive symptom of proctitis and is invariably present, conforming in degree to the mildness or severity of the attack.

During the stage of acute congestion constipation is ordinarily present, but is quickly followed by diarrhea. At first the discharges consist of thin fecal matter alone. Soon mucus of an acrid, irritative character begins to appear and the tenesmus rapidly increases. Later on the mucus becomes tinged with blood and ultimately may contain pus also. When this latter element (pus) appears it is unmistakable evidence that loss of substance, *i.e.*, ulceration, has occurred.

As a result of the frequent and irritating discharges the delicate lining membrane of the anal canal becomes excoriated and the sphincter spasmodic and painful, thereby adding materially to the patient's distress. In consequence of the discharges, also, the skin about the anus is kept moist and irritated and pruritus, often complicated by painful fissures, may become an added annoyance.

Diagnosis.—When a case presents the symptoms as above outlined, the diagnosis of acute proctitis is clear and unmistakable. But it must be borne in mind that the inflammatory process may be secondary to some other and far more serious lesion the nature of which can only be determined by physical examination. Intelligent working knowledge of the case, therefore, demands that the symptoms be interpreted merely as indicative of a probable condition, not as sufficient for a definite diagnosis.

Both digital and instrumental examinations occasion considerable pain in acute proctitis, and should be resorted to with great gentleness. To the finger the rectum feels unnaturally hot and the mucous folds thick and edematous. In the early stages the mucosa is dry and more or less rough; later it feels smooth and slimy owing to the presence of

mucus. Polypi, stricture, cancer, and other forms of pathology may readily be detected by the sense of touch.

When viewed through the proctoscope the mucosa appears of a bright-red color, greatly swollen, and dry or covered with mucus, depending on the stage the complaint has reached. The thickened and infiltrated condition of the mucous membrane is often such as to prevent inflation. When this is the case it is unwise to make forcible efforts in that direction, and the passage of the instrument into the higher parts should be attempted, if at all, only with the utmost caution. Aside from the traumatism which may so readily result from instrumentation under these circumstances, the possibility of carrying infectious material into the upper portions must be considered. The latter danger is especially imminent in cases of gonorrheal origin, and for that reason, particularly when the discharges are purulent, the evidence of the microscope should be sought before either examination or treatment is undertaken.

The prognosis in simple acute proctitis is always favorable. Under appropriate treatment the inflammation will usually subside in a few days and complete restoration to health follow within a week or ten days.

Complications and Sequelæ.—In cases of unusual severity the inflammation may be so violent as to invade the deeper coats of the bowel and even the perirectal tissues. Ulceration and sloughing, followed by stricture from vicious cicatrization, abscess and fistula, and occasionally peritonitis, may result. Prolapse from the straining, and pruritus from the discharges, may also be encountered in a certain proportion of cases.

In neglected cases and those which fail to receive the proper attention the trouble may become established in the chronic form. Exceptionally this result follows in spite of the most faithful and intelligent treatment.

Treatment.—In the discussion of etiology it was stated that mechanical irritation is the underlying factor in the great majority of cases of acute proctitis. If that be true, obviously the first indication of treatment is the removal of the source of irritation, whether it be costive or impacted feces, polypi, oxyurides, or what not. When this has been accomplished the further treatment is usually as satisfactory as it is simple. Rest in the recumbent position should be insisted upon from the beginning, as thereby the tenesmus is ameliorated and resolution of the inflammation promoted. An initial purge, preferably saline for its depleting effect, should be administered, and the patient's diet restricted to the blandest articles for the first few days.

Relief of the tenesmus is an early and urgent indication. This may sometimes be accomplished by prolonged (10 to 20 minutes) irrigation with normal salt or boric acid solution as hot as can be borne, using the familiar return-flow rectal irrigator (Fig. 52) for the purpose. Prolonged (15 to 30 minutes) hot sitz baths are also useful in this connection. If these measures fail to give relief, an ounce or two of warm mucilage of acacia, olive oil, or starch water containing 15 to 20 drops of tincture of opium may be injected. Suppositories should not be used for this purpose, as their presence causes irritation and increases the inclination to strain. Medication by the mouth is of little avail except as demanded by the constitutional symptoms.

As the inflammation subsides astringent, antiseptic, and stimulant irrigations are called for. Nitrate of silver (5 or 10 grains to the



Fig. 52.—Bodenhamer's return-flow rectal irrigator.

pint) is one of the best of these. Others of proved value are zinc sulphate (1 dram to the pint), permanganate of potash (1 to 4:5000), and argyrol (2 to 4 per cent.). The same remedies may be applied in the form of a spray, their strength when used in this way being considerably increased.

When much suffering is caused by an irritable sphincter which cannot be speedily relieved by simpler measures, it should be divulsed under general anesthesia. Unexpected improvement of the proctitis often follows this operation, doubtless due, in part at least, to the copious antiseptic irrigations which accompany it in modern practice.

When oxyurides are found to be the exciting cause of the complaint their dislodgment is the first indication. This is readily accomplished by repeated injections of lime water or mild infusions of quassia. It is well to supplement these local measures with anthelmintics administered by the mouth, of which santolin is the best. After the offending organisms have been completely eradicated the proctitis will sometimes rapidly disappear without special treatment. Should this not occur, the remedies and measures already laid down will be found effective.

CHRONIC PROCTOCOLITIS (COLOPROCTITIS).

Chronic inflammation of the rectum in the vast majority of cases involves the upper portions of the large bowel also. The term proctocolitis is therefore more accurately descriptive of this type of the affection and will be employed in this section.

Chronic proctocolitis is met with under two forms, the *atrophic* and the *hypertrophic*. The former may be regarded as primary, appearing *de novo* as a chronic disease; the latter is usually, though not always, secondary to the acute variety.

The ordinary conception of the distinguishing features presented by these two conditions seems rather vague and indefinite. Since their symptoms and treatment are in many respects identical, from a practical standpoint other differences may be regarded as relatively immaterial. But from a scientific point of view it is essential to the comprehension of any disease to be able to recognize and differentiate between the several clinical types which it may assume. The salient points of difference between the atrophic and hypertrophic varieties of chronic proctocolitis may be contrasted as follows:—

ATROPHIC.

1. Usually a chronic disease *de novo*.
2. Rarely extends beyond the sigmoid flexure.
3. More frequent in men.
4. Mucous membrane congested, dusky red in color; dry; adherent particles of inspissated feces; bleeds easily on touch.
5. Secretion scanty.
6. Rectum readily inflatable.
7. No tendency to the formation of polypi.
8. Does not involve the deeper structures.
9. Process often involves tissues of anal canal and perianal region, which are easily injured by distention, resulting in pruritus.
10. Constipation invariably a conspicuous feature.
11. Sphincter contracted and irritable.
12. Treatment tedious and often unsatisfactory.

HYPERTROPHIC.

1. Very often secondary to the acute variety.
2. Often involves the entire colon.
3. More frequent in women.
4. Mucous membrane pale and swollen; covered with thick, tenacious mucus.
5. Secretion copious.
6. Inflation difficult, often impossible.
7. Polypi frequently present; in long-standing cases may be very numerous.
8. May extend to muscular coat and perirectal tissues; abscess, stricture, etc., may result.
9. Pruritus frequently present as the result of maceration by the constant discharges.
10. Abnormal laxness of bowels the rule, especially in the beginning.
11. Sphincter usually relaxed.
12. Quite amenable to treatment begun early.

Etiology and Pathology.—The *atrophic* form, in the author's opinion, more frequently results from chronic constipation and the habitual use of purgative medicines than from any other causes. Repeated resort to soap-sud and other irritant-bearing enemata is doubtless also often to blame. According to this view the digestive disturbances which are so often associated with the trouble are either manifestations of the same process which results in the constipation, or secondary, by reflex action, to the rectal inflammation.

Another frequent cause is the habitual overindulgence in highly seasoned food and alcoholic beverages. Aside from the tendency of such diet to produce constipation, the effect of the condiments and alcohol is directly and positively irritant to the intestinal mucosa. A large majority of all the cases which have come under the author's observation were met with in high livers, those who indulged in game suppers, midnight lunches, and were addicted to the regular use of intoxicants and strong cigars.

Certain individuals seem to be predisposed to this form of the disease, as evidenced by the fact that they are victims of nasal catarrh of a similar type, which is excited or maintained by apparently trivial causes. The rectal mucosa of such persons seems to participate in the general susceptibility to catarrhal involvement. Bad sanitary environments are often responsible in these cases.

Syphilis has been charged with the causation of this as of almost every other form of chronic trouble known to clinicians. No analogous affection of other parts, of demonstrable syphilitic origin, is recognized, and it is extremely doubtful whether atrophic catarrh of the lower bowel is ever so caused. To be sure, it may occur in a syphilitic subject, but the etiologic relation is purely conjectural.

The etiology of the *hypertrophic* form is less obscure and difficult to trace. When the acute disease assumes a chronic type it is uniformly of this variety; consequently its etiology may be said to embrace all the factors and agencies enumerated under the first section of this chapter. But it must be remembered that in not a few cases the affection originates in the colon, the involvement of the rectum occurring secondarily. In these cases other and different causes must be sought for.

Undoubtedly the most frequently operative of the special causes is intestinal indigestion and fermentation. This is usually due to the ingestion of disproportionate quantities of starchy foods, as bread, oatmeal, rice, and potatoes. When more of this kind of diet is consumed than can be completely digested, fermentation is apt to ensue and the decomposing products act as irritants to the intestinal mucosa

as they pass toward the outlet. If the error in diet is not speedily corrected and appropriate treatment instituted, irritation is followed by inflammation and the pathologic process soon becomes established.

Another frequent cause is right movable kidney. Here the irritation is mechanical and is due to the direct and constant contact of the kidney with the posterior surface of the ascending colon and cecum. The digestive derangement so commonly present as a result of the renal lesion may be regarded as an accessory causative factor. The greater prevalence of the hypertrophic form of the disease among women is probably in part accounted for by the relative frequency of the occurrence of movable kidney in that sex.

Chronic appendicitis must also be reckoned as an etiologic factor in certain cases. Whether or not the appendiceal trouble can be considered a direct cause in originating the disease of the colon and rectum, it certainly sometimes serves to perpetuate it. This has been demonstrated by the author to his complete satisfaction in a number of cases by the rapid subsidence and early disappearance of the bowel affection following removal of the diseased appendix, after all other methods of treatment had failed. Tuttle¹ strongly indorses this view.

Finally with reference to the special causes of hypertrophic coloproctitis, general enteroptosis deserves to be mentioned. The chronic congestion of the viscera incident to this condition ultimately results in a low grade of inflammation of a most obstinate character, sometimes assuming the form of membranous colitis. Multiparous women are most frequently the victims of the disease when so caused.

The **pathology** of the two forms of chronic proctocolitis is well indicated by their names. In the *atrophic* form the mucosa is thin and inelastic, the crypts of Lieberkühn atrophied and the substance between them greatly decreased. The solitary follicles appear enlarged and prominent, due to the atrophied condition of the surrounding mucosa. Numerous minute ulcerations may be demonstrated with the microscope, thus accounting for the tendency of this variety to bleed.

The characteristics of the *hypertrophic* form are exactly opposite. Here the mucosa will be found greatly thickened, the follicles of Lieberkühn hypertrophied, and the interglandular spaces increased both in depth and width. The submucous connective tissue is also markedly thickened, and the solitary follicles, though participating in the hypertrophic changes, are relatively inconspicuous.

Symptoms.—The symptoms of the two forms of chronic catarrh for the most part are identical. When the disease follows an acute

¹ Diseases of the Anus, Rectum, and Pelvic Colon, p. 147.

attack there is merely a gradual diminution in the severity of the symptoms; otherwise their onset is almost imperceptible, the patient's attention being first attracted by a feeling of vague discomfort in the parts. Pain is rarely present, but there is a sensation of heaviness in the rectum, with sometimes an indefinite aching referred to the region of the perineum, sacrum, or hips and lower extremities. Occasionally, especially in male subjects, some derangement of the bladder function is noted and, rarely, undue excitability of the sexual organs. Tenesmus, flatulence, and indigestion are constant accompaniments of the disorder, and impaired appetite, a pale-coated tongue, loss of weight, dull headache, and an unhealthy, sallow complexion are other common symptoms. Mental depression, amounting in some instances to melancholia, is not infrequently a marked feature of these cases. This tendency seems to characterize most chronic bowel disorders, due probably, in large measure at least, to the digestive derangement, malnutrition, etc., which so commonly accompany them.

In the atrophic form constipation is always present, the secretion is scanty, the sphincter is usually contracted and irritable, and the act of defecation is attended with straining and often pain. In the hypertrophic form the stools vary in consistence, but the sphincter is relaxed and the secretions so abundant that defecation is accomplished without other discomfort than that due to the accompanying tenesmus.

Pruritus is a frequent symptom of both varieties, the perianal tissues partaking closely of the characteristics of the disease process present in the rectal mucosa. In the one case the parts are comparatively dry, but inflamed, tender, and easily cracked or fissured by handling; in the other they are constantly bathed by the discharge from above and the radiating folds are hypertrophied and edematous.

Ulcerations are rather common in the atrophic variety, due doubtless to the pressure and traumatism inflicted by the costive feces. They are usually minute, but may coalesce and result in more or less extensive granulating areas. For this reason the mucus which streaks the stools may contain a considerable quantity of both blood and pus. Occasionally fresh, unmixed blood is found adhering to the mass, or a few drops may follow its expulsion.

Ulceration is not a characteristic of the hypertrophic form. As a rule, it is met with only in cases of long standing in which prolapse from constant straining, stricture, or other complication has developed. No hemorrhagic tendency is noted in this variety, though in old cases the copious mucous discharges are usually of a pinkish tint from slight admixture with blood, the exact source of which it is often impossible to determine.

Other rectal lesions may be present in both varieties of chronic catarrh. Internal hemorrhoids and fissure may be mentioned with reference to the atrophic form. When hemorrhoids are found in the hypertrophic form they are usually of the external variety, and result from the long-continued irritation of the anal margin by the discharges. The tendency to the development of mucous polypi and other complications in the latter form has already been alluded to.

The **diagnosis** presents no difficulties. The history of the case, the symptoms, and the appearance of the external parts will usually point strongly both to the nature of the trouble and the particular variety to be dealt with, and proctoscopic examination will supply the details. From what was said in the discussion of etiology the importance of carefully investigating the abdominal organs and their functions is apparent. In fact, it cannot be too strongly urged that such examination be made as a matter of routine in all these cases. The discovery of a movable kidney or a chronically diseased appendix may prove of more real value to the patient than the most exhaustive knowledge of his local condition.

The **prognosis** of chronic proctocolitis is, generally speaking, good. Considerable time, however, is usually required to effect a cure, and the patient should always be impressed with this fact as well as with the necessity of care and faithfulness in carrying out instructions.

Treatment.—The successful management of this condition will require the employment of general as well as local measures in practically every case. The nature of the former will depend upon the particular cause or causes operative in the individual case. If inspissated or impacted feces are present, they must first be removed and the tendency to constipation overcome. If the diet and habits are faulty, they must be corrected. If the source of irritation is proved to be a misplaced uterus, an enlarged prostate gland, or an abdominal or pelvic tumor, such pathologic condition must receive appropriate attention. If a right movable kidney or a diseased appendix is found to exist, it will be a wise precaution to advise the patient that in all probability he will not be permanently relieved until the kidney has been anchored or the appendix removed. Cheerful surroundings, an abundance of fresh air and sunshine, tonics, and in most cases moderate out-of-door exercise will be found of benefit.

Under general management one special indication of treatment calls for more than passing mention. Intestinal indigestion is so often a factor both in originating and maintaining this condition that it should be suspected in all cases, even when its characteristic manifestations of fermentation and flatulence are not actively in evidence. To correct this

trouble the patient should be placed upon a diet as nearly free from starchy elements as possible and all alcoholic stimulants, condiments, and rich concentrated foods positively interdicted. The diet should be largely nitrogenous and consist of the blandest and most easily digested articles, such as clear broths, eggs, rare beef, fish, chicken, etc. When gluten bread cannot be obtained, thoroughly browned toast may be substituted, but should be sparingly partaken of. Tea and coffee in moderate quantities usually seem harmless, but are better left off. If milk is taken at all, it should be peptonized and well diluted. A small quantity of orange-juice is usually harmless, but as a class, fruits and vegetables should not be indulged in, at least until the trouble is well under control. A recent article by Southern writers² lauds the virtues of a diet of cooked turnip-tops, mustard "salad," young *phytolacca* ("poke") shoots, etc., in the treatment of chronic diarrhea. This dish is familiar in the Southern States under the provincial name of "greens," and is largely consumed at certain seasons of the year, being popularly supposed to be exceedingly healthful. The attention of the writers of the article was attracted to the subject by accident; but they report a series of cases, including two of amebic dysentery, in which they tested the remedy with the happiest results, relief and permanent cure following in several instances after all other forms of treatment had been exhausted. The description of the cases is too meager to enable them to be classified, and no attempt is made to explain the mode of action of the remedy. The matter is referred to here because the author's limited experience with the method would seem to warrant doing so. The three personal cases in which it was tried were of the type under discussion,—chronic proctocolitis,—in each of which other methods of treatment had been employed with only temporary benefit. In every instance relief was promptly obtained and a speedy cure followed. Whether the result is to be attributed to the special virtues of the "greens," to the bacon with which they were cooked, or to the coincident medication, restricted diet, and hygienic measures the author is not prepared to say.

Internal medication to correct and prevent intestinal fermentation is usually called for. This indication will be met by the combination of an intestinal antiseptic with one or more of the digestive ferments. The following will be found a serviceable formula:—

R Bismuth salicylate or
Betanaphthol,
Pancreatin,
Taka-diastaseãã gr. v.

M. Sig.: To be taken in capsule or powder one hour after each meal.

² "Turnip-top Treatment of Chronic Diarrhea and Amebic Dysentery," by Wilson and Pressly, Jour. Amer. Med. Assoc., March 9, 1907.

Other useful antiseptics are: sulphocarbolate of zinc (gr. iij to v), salol (gr. v), boric acid (gr. iv to viij), and ichthyol (gr. iij to v in capsule). As these agents are intended to act in the small intestine they should not be exhibited earlier than an hour after food is taken.

One of the most important items of the general management is the initial unloading of the bowel and the regulation of this function. For the first-named purpose the salines are generally preferable by reason of the coincident depletion they accomplish. Sulphate of magnesium or



Dutro & Hewitt, Memphis, Tenn.

Fig. 53.—Jelk's recurrent rectal tube.

any of the reliable laxative mineral waters, given in small, repeated doses until the desired effect is produced, will be found satisfactory. Thereafter a single dose taken in a glass of hot water, preferably before breakfast, will usually be sufficient for the daily needs. Castor oil is recommended by many writers, and is probably the most satisfactory of all laxatives when a constipating after-effect is desired. After the primary unloading of the bowel is accomplished the daily use of plain-water enemas, preferably cold if well tolerated, may be advised. These serve the double purpose of a tonic and cleansing agent to the large bowel. They should always be suspended as soon as the inflammatory condition is relieved and any tendency to constipation treated according to the principles laid down in the chapter on that subject.

Local Treatment.—In the local treatment of the diseased gut three methods are available: irrigations, injections, and direct applications through the proctoscope by means of cotton swabs or sprays, all of which will usually be called for at some time in the management of each case. Hot irrigations of boric acid or weak (1:500) carbolic acid solutions are of great benefit, relieving congestion and tenesmus, promoting the absorption of inflammatory products, and cleansing the parts in preparation for further medication. To be effective, however, they should be administered slowly and in large quantities (1 to 2 gallons), the recurrent irrigator or, preferably, the recurrent rectal tube devised by Jelks, of Memphis (Fig. 53), being employed. If the case is of the ambulant type, the irrigation is best given at bedtime and followed by an astringent or soothing solution to be retained overnight. The amount of the latter solution must necessarily be comparatively small, rarely exceeding 4 ounces, and should be deposited well up in the sigmoid, whence its distribution in both directions is effected by peristalsis and gravity. A desirable formula for this purpose is:—

R Fl. ext. hydrastis (non-alcoholic)	3ij-iv.
- Iodoform	3j.
Mucilage of acacia	q. s.

Fluidextract of krameria may be substituted for the hydrastis, subnitrate of bismuth (2 to 4 drams) for the iodoform, and olive oil for the mucilage of acacia, if desired. Very beneficial results may sometimes be obtained from ichthyol (2 to 5 per cent.) in the oil menstruum, used in the same manner.

When stimulation is required the silver salts are the best agents. The nitrate is the most generally efficacious of these, but has the disadvantage of being much more irritant than the organic preparations. When used as an injection the strength of the solution may be from 5 to 30 grains to the pint ($\frac{1}{3}$ to 2 per cent.), depending upon the conditions present and the result to be accomplished. As a spray it may be used much stronger (1 to 5 per cent.), and for application to limited areas with the cotton swab the strength may be from 4 to 10 per cent.

The best known of the organic salts are argyrol, argonin, and protargol. The author is partial to the first named for the reasons that it is almost wholly free from irritant qualities even in solution as strong as 10 per cent., and seems to act in the average case fully as well as the nitrate. The strength in which these agents are employed varies from 2 to 10 per cent., depending upon the condition and the method of application.

The stimulating applications, as a rule, should not be used oftener than every second day to begin with, then twice a week, and finally once

in five to ten days, the strength of the remedial agents being increased as the frequency of their exhibition decreases, and the soothing and astringent agents being employed in the intervals.

When annoying or painful conditions of the anal canal and perianal tissues exist they should receive appropriate attention in accordance with the principles laid down in the preceding chapter, while the internal affection is being treated. Occasionally the parts are so painful and the sphincter so irritable that the internal treatment cannot be carried out. In such cases a general anesthetic should be administered and the sphincter thoroughly divulsed, any indicated surgical procedures being at the same time executed.

In rare instances it may be found advisable, in order to set the parts at rest and facilitate treatment, to perform a colostomy. Such exigency will seldom arise, and when it does will be found to be attributable to the onset of some complication in a neglected case, rather than to the intractable nature of the disease process itself.

CHRONIC (MUCOUS) COLITIS; MEMBRANOUS COLOPROCTITIS.

Strictly speaking, this peculiar form of inflammation of the large bowel does not fall within the scope of the present work. Yet for the reason that it is, at least in its leading features, a local disease which involves the rectum in the majority of cases, and because it so often falls into the hands of the proctologist for treatment, it seems advisable to consider it briefly in this connection.

Membranous colitis may be defined as a chronic inflammation of the mucosa of the colon, sometimes involving that of the rectum also, which is characterized by copious discharges of mucus, often in the form of casts, flakes, or membranes, the discharges occurring at irregular intervals and being usually preceded by severe colicky or griping pains.

Two widely divergent views are entertained as to the true nature of this affection. According to one it is a secretion neurosis,—a local expression of obscure causes operating through the general nervous system. This view is defended on the ground that the malady is seldom found except in neurotic subjects, and that it is practically always associated with anemia, chlorosis, malnutrition, or other condition of a constitutional character. Admitting the truth of these contentions, no adequate reasons have been advanced to prove that these conditions are not the *result* of the intestinal lesion rather than the cause of it, and those who hold this view cannot be considered as having established their claim until this fact has been clearly demonstrated.

The second theory is that the inflammatory process in the colon is primary and local in origin, and that it differs only in certain of its manifestations from the ordinary hypertrophic form of chronic proctocolitis. Without extended argument in support of this view, its correctness may be said to be conclusively established by the result of treatment. The advocates of the neurosis theory have little but failure, or at best temporary benefit, to report, and with singular uniformity emphasize the lack of success to be anticipated from treatment; while, on the other hand, those who endorse the idea of the local nature of the affection and treat it accordingly, maintain that it is little, if any, more intractable than other varieties of chronic inflammation of the large bowel. Again, it may be observed that if the idea of the nervous origin of the disease were true, its occurrence among the inmates of institutions for the insane, epileptics, etc., should be notably frequent. Such is not the case, as the records of these institutions will show.

The colon being the portion of the bowel chiefly involved in the inflammatory process, critical study of the pathology of the disease in the living subject is both difficult and unsatisfactory; and, since it is seldom fatal, opportunities for post-mortem investigation are rarely presented. The consensus of opinion, however, seems to be that its pathology is essentially the same as that of the hypertrophic form of chronic proctocolitis. Assuming that this conception is correct, the inference follows that the same type of causes is operative in the one case as in the other, and the truth of this conclusion is borne out by clinical experience. Two special points in connection with the etiology, however, require to be noted: first, that membranous colitis is not to be regarded as the result or sequela of an acute inflammatory process, but is essentially a chronic affection from the beginning; second, that the causes which produce this special form of colitis belong in the main, if not exclusively, to a particular class, namely, those which act mechanically. Enteroptosis, movable kidney, adhesive bands, and extraintestinal growths which result in continuous pressure upon some portion of the colon, are the most noteworthy of this particular class of causes. This point is deserving of especial emphasis. In every case which the author has had the opportunity to observe one or more of these conditions was found, the first mentioned, enteroptosis, being present in the majority of instances.

This view of the etiology of the disease throws some light upon the phenomenon of the formation of a membrane, which is usually considered so difficult of explanation. The portion of the gut involved is generally high and more or less circumscribed, the rectum being implicated only indirectly and in minor degree. Hence, tenesmus not being

an active feature, the tenacious mucus secreted as a result of the inflammatory process is retained for comparatively long periods of time, and becomes inspissated and adherent. When the accumulation becomes sufficient to excite irritation active peristalsis results and detachment and discharge of the membrane or cast follow. A similar phenomenon is not infrequently observed in certain cases of chronic proctitis when examined with the proctoscope, mucus in the form of shreds or flakes being seen adhering to the rectal walls.

Only two **symptoms** can be considered at all distinctive of membranous colitis. One has already been referred to, *i.e.*, the discharge of a membrane at irregular intervals. The other is the violent colicky pains which precede the appearance of the membrane and constitute what is known as an "attack." These attacks are sometimes so severe as to prostrate the patient for several days, and are doubtless responsible in large measure both for the physical weakness and the mental depression which characterize the disease. Other symptoms, such as anemia, anorexia, malnutrition, etc., are common to all varieties of chronic intestinal inflammation. Impairment of the digestive function and auto-intoxication from the accompanying constipation are the usual means by which these evil results are produced.

Treatment.—Since mucous colitis is to be considered as a local disease, differing from the hypertrophic form of chronic proctocolitis only in the item of the portion of the bowel involved, it is unnecessary here to repeat the various methods and measures of treatment set forth in the foregoing pages for the management of the latter complaint. It is important, however, to emphasize that the probable mechanical origin of the disease must be kept in mind and careful investigation made along this line. Many a case has doubtless been doomed to permanent invalidism because a movable kidney, enteroptosis or other condition producing chronic irritation and congestion was overlooked, or its etiologic significance ignored.

In the absence of such causes or following their removal, local measures for the relief of the inflamed mucosa should be instituted. Colonic irrigations with hot water containing a mild antiseptic, such as boric acid, and followed by soothing applications of olive oil and iodoform or hydrastis deposited high up, should be employed daily. It is also of great importance to relieve constipation and provide against its recurrence. For this purpose castor oil in moderate daily doses is the most generally useful remedy, though olive oil sometimes answers well and has the decided advantage of comparative palatability.

General tonics and hygienic measures are always indicated in these cases. Occasionally a cure will be greatly hastened by a complete change

of scene and climate. A sea-voyage or a trip to the mountains will sometimes start a patient on the road to recovery when everything else has failed.

Further than sympathy, encouragement, and assurance of ultimate restoration to health, the mental and nervous phenomena usually present in these cases do not require treatment and need occasion no special anxiety. Improvement in this respect will usually be remarkably rapid and satisfactory as the underlying physical cause is removed.

In the rare instances in which the disease has become so firmly established and the changes in the gut of such a nature that they cannot be reached by the measures indicated, it may be necessary to perform a colostomy for the double purpose of setting the parts at rest and providing a more direct means of local treatment. Obviously, the site of the operation in such cases will be determined by the portion of the gut involved. Instead of a right inguinal colostomy, which is always to be avoided when possible, an appendicostomy, or valvular cecostomy after the method described by Gibson,³ may be found to answer the purpose.

³ Medical Record, vol. i, p. 405, 1901.

CHAPTER VII.

Ulceration (Non-malignant).

VARIOUS classifications of ulceration have been proposed and from the number much confusion has resulted. In order to clarify the situation in some measure it may be stated at the outset that every form of ulceration is modified and maintained, if not originated, by bacterial action. Indeed in certain types this seems the chief determining factor, while in others it is necessary to admit the existence of underlying exciting causes by which the tissues are rendered vulnerable.

The simplest and most obvious classification of the subject is according to location: (1) ulceration of the anus (anal canal); (2) ulceration of the movable rectum. The former differs so radically both as to symptoms produced and treatment required, and in addition is so important from the standpoint of frequency of occurrence, that its discussion will be reserved for a separate chapter.

ULCERATION OF THE MOVABLE RECTUM.

For convenience of description non-malignant ulceration of the rectal ampulla may be divided into two classes, simple and specific, the latter including the *dysenteric*, *venereal* and *tuberculous* varieties. Clinically there is little to distinguish these classes and varieties, the differentiation, not always possible to make, depending upon study of the history and the use of the microscope.

Discussing first the simple type, the several varieties of the specific type will then be considered.

SIMPLE ULCERATION.

Most authors subdivide simple ulceration into a number of distinct varieties, as hemorrhoidal, varicose, catarrhal, follicular, etc. I am convinced that this is both unnecessary and unwise. However initiated, clinically the lesions are practically indistinguishable and, moreover, it is usually impossible to determine any pathologic differences.

Women are said to be affected more frequently than men, though the claim is not substantiated by available statistics. Considering the

anatomy and functions of the female pelvis, however, it is doubtless true that the rectum is more often exposed to traumatism and infection from neighboring organs than in men.

The disease is met with both in childhood and old age, but is much more common during the period of vigorous adult life.

Etiology.—Infection is necessary to ulceration in any part of the body. Assuming this to be true, the chief problem in connection with the etiology is, in view of the constant bacterial contents of the bowel, to determine the factors which render possible invasion of the mucosa.

The chief predisposing factor is venous congestion, the chief exciting factor traumatism. To understand the former it is only necessary to recall the anatomy of the rectum with reference to its blood-supply, and to remember that the rectal veins, in common with the other radicles of the portal system, are destitute of valves. In the erect position natural to man the weight of the superimposed blood-columns must be supported in some degree by the venules of origin. Again, after a hearty meal and during the process of digestion all the veins of the portal system are more or less engorged, and consequently, at such times, the inferior mesenteric and its tributaries may be said to be in a state of physiologic congestion. Thus, while in other situations rightly regarded pathologic, in the rectum venous congestion may be said to be, for at least a portion of each day, the normal condition.

Any derangement of the liver, whether organic or functional, whereby interference with its circulation results, would tend toward a similar end. Under this head belongs that indefinite though popular and widespread ailment known as "torpid liver."

Likewise a condition of venous stasis is not infrequently caused by pressure from without the rectal wall incident to a pelvic neoplasm, a greatly enlarged prostate gland, a retrodisplaced uterus, etc.

And finally, in this connection, constipation as a causative factor must be considered. In the production of simple ulceration it plays a twofold part and, properly estimated, doubtless furnishes the true explanation of a large proportion of all cases. As predisposing cause it acts to the same end, though in a different way, as the causes already mentioned, namely, by inducing venous congestion. The passage of a large costive stool is in a direction opposite to the return blood-current, so that a state of congestion, active if only temporary, results at every such movement. Frequently repeated, as in the victims of habitual constipation, this must be a considerable factor in weakening the vessel walls, thus laying the foundation for the development of ulceration as well as other pathologic conditions. The *modus operandi*

of this factor may be well likened to that of an elastic bandage applied with moderate force around the arm or leg toward the distal extremity. With each turn the congestion of the hand or foot becomes more marked and the veins more distended and prominent. In the case of the costive stool the bandage is replaced by the elastic rectal wall, and the solid substance of arm or leg by the fecal mass, while the analogous motion is supplied both by peristaltic contraction of the former and by the gradual descent of the latter.

As exciting cause constipation may play a part even more noteworthy in the production of the initial lesions. The mechanical irritation incident to the passage of a large, costive stool, especially if, as is not infrequently the case, it presents a roughened surface or contains a projecting foreign body, often constitutes the inception of the trouble by producing an abrasion or other injury of the rectal mucosa, thus furnishing a site or sites for bacterial invasion.

The presence of an impacted mass in the rectum and the strenuous measures sometimes resorted to for its delivery may result in traumatism sufficient to produce extensive and obstinate ulceration.

In fact, traumatism, however produced, must be regarded as the prime exciting cause of this disease. The original injury, though in itself simple and trivial, is sustained by an organ unique both in structure and function and one in which, by reason of its peculiar office, the reparative process is necessarily slow and subject to repeated interruptions.

In addition to constipation certain other causes of the primary lesion are worthy of mention. The pressure of the child's head in parturition is cited by many authors as a frequent cause. If this were true, the proportion of cases should largely preponderate in women. And this is probably true, though for obvious reasons they are not so often encountered as in men, except perhaps in hospital and dispensary practice.

The introduction of foreign bodies from without is another cause of traumatism by no means so rare as might be supposed, if trickery, concealment, and the various forms of sexual perversion are borne in mind.

Another prominent exciting cause is the traumatism resulting from operations for internal hemorrhoids, fistulæ, etc. Owing to the congestion attendant upon these diseases the conditions are always favorable for the development of indolent, sluggish wounds, and chronic ulceration is a natural and not infrequent consequence. Especially does it occur when faulty or injudicious methods of operating are resorted to (notably the injection of internal hemorrhoids), and

when the patient is allowed to assume the erect posture too soon. It is possible also that the injury inflicted by the habitual use of enemas, in pursuance of a widespread and pernicious fad, should be counted among the etiologic factors.

It must not be forgotten that ulceration may be a sequel of proctitis, more particularly the acute type. Therefore the various causes described in the chapter on that subject must also be considered as included among the possible causes of ulceration. Indeed, whatever their true relation, the latter is seldom present without the former, and in many cases the difference seems to consist rather in degree than in kind.

And finally with reference to etiology it remains to be noted that the influence of certain depraved or vitiated conditions of the general system may be potent elements in the production and maintenance of simple ulceration. The debilitated state incident to protracted fevers and the later stages of phthisis pulmonalis often seems to predispose to the disease. Deserving of special mention in this connection are diabetes, nephritis, and the so-called gouty diathesis. Though obscure and difficult of explanation, this relation should not be ignored. In the case of a well-nourished or plethoric patient with ulceration for which no other satisfactory cause can be found, the astute diagnostician will not fail to include the kidneys and their function in his investigations. In fact, it is well to establish the routine of making a careful urinalysis in every case before starting the treatment.

Symptoms.—The symptoms of ulceration of the movable rectum, whether of simple or specific type, are so nearly identical that one description will suffice for all varieties. They are (1) diarrhea, (2) pathologic discharges, (3) pain, (4) hemorrhage, (5) pruritus, and (6) reflex disturbances, as a rule characteristic and distinctive in the order given. It is to be understood that these symptoms do not usually exist singly, but associated two, three or all in a given case.

1. *Diarrhea* is a constant symptom, most marked at the beginning of disease and during the early morning hours. Contrary to the accepted idea, it is not difficult of explanation. The abnormal secretion from the ulcers, together with that from the coexisting proctitis, acts as a solvent of the fecal matter and at the same time supplies undue lubricity. In addition it is an irritant, powerfully stimulating peristalsis and exciting expulsive effort which in the advanced stages may become almost continuous. The number of calls to stool may be as many as twenty or more in the twenty-four hours, the resulting passages being small in amount and composed rather of the irritating secretions than of fecal material. There can be no doubt that many cases of ulceration, because

of this symptom, have been and are even today being treated as "chronic diarrhea" and "chronic dysentery," with results alike discouraging to the physician and disastrous to the patient.

2. *Pathologic discharges* consist of mucus, pus, and blood in varying proportions. As stated above, many of the evacuations in advanced cases are composed of these elements alone, constituting a pseudodiarrhea. The pus is the characteristic element of the discharges. Whenever it can be demonstrated, ulceration may be known to exist at some point in the intestinal tract.

3. *Pain*.—When the lesions are located entirely above the anal canal acute pain is not a prominent symptom of this affection. Tenesmus more properly expresses the discomfort suffered by the patient; and the straining which is the chief element in tenesmus may be even more wearing and intolerable than real pain. The tolerance sometimes noted in these cases is, however, quite remarkable, even extensive ulceration, especially when the disease is of long standing, occasionally giving rise to nothing more than discomfort. A sensation of heat, weight and dull aching in the rectum is often complained of, but this is probably due rather to the associate rectitis than to the ulceration proper. When the disease involves the anus, of course pain may be expected to be a pronounced symptom.

4. *Hemorrhage* and (5) *pruritus* are purely adventitious symptoms, the former due to the erosion of blood-vessels by the disease process, the latter to the contact of the irritating discharges from above with the delicate tissues of the anal canal and surrounding integument.

6. *Reflex disturbances* are likewise inconstant and comparatively rare. They may be manifested in the intestinal tract, increasing peristalsis and contributing to the production of the gastrointestinal indigestion so often seen in the disease. Or they may manifest themselves in the form of perverted sensation, *i.e.*, pain in the neighboring organs. Familiar examples of the latter are irritability of the bladder and, in the female, obscure pain referred to the internal genital apparatus, which is apt to be of a neuralgic character. In the presence of such phenomena confusion and error may occasionally be avoided by remembering their possible rectal origin.

The symptoms of ulceration and its ultimate effects upon the general health are well summed up in the classic description of Allingham¹:—

"In the majority of these cases the earliest symptom is morning diarrhea, and that of a peculiar character. . . . The patient will tell you that the instant he gets out of bed he feels a most urgent desire

¹ Diseases of the Rectum, 2d edition, pp. 171 *et seq.*

to go to stool; he does so, but the result is not satisfactory. What he passes is generally wind, and a little loose motion, and some discharge resembling coffee-grounds both in color and consistency. . . . The patient in all probability has tenesmus and does not feel relieved; there is something of a burning and uncomfortable sensation, but not actual pain; before he is dressed very likely he has again to seek the closet; this time he passes more motion, often lumpy and occasionally smeared with blood. It also may happen that after breakfast . . . the bowels will again act; after this he feels all right and goes about his business for the rest of the day, only, perhaps, being occasionally reminded by a disagreeable sensation that he has something wrong with his bowel

"After this condition has lasted for some months, more or less, as influenced by the seat of the ulceration and the rapidity of its extension, the patient begins to have more burning pain after an evacuation; there is also greater straining and an increase in the quantity of the discharge from the bowel; there is now not so much jelly-like matter, but more pus, more of the coffee-ground discharge, and blood. The pain suffered is not very acute, but very wearying, described as like a dull toothache, and it is induced now by much standing about or walking. At this stage of the complaint the diarrhea comes on in the evening as well as in the morning, and the patient's health begins to give way; . . . he is dyspeptic, loses his appetite, and has pain in the rectum during the night which disturbs his rest; he also has wandering and apparently anomalous pains in the back, hips, down the leg, and sometimes in the penis."

Diagnosis.—With ordinary care the diagnosis of this disease is not a difficult matter. No more characteristic group of symptoms attends any disease in any part of the body, and when present as above described they point unerringly to ulceration of the movable rectum. But they tell us little as to the exact location, character and extent of the lesions,—information which can only be obtained from physical exploration of the organ. It is much easier, however, to accept the patient's diagnosis of "chronic dysentery" and trust in Providence and a diarrhea mixture; and, sad to admit, this course is still the one far too frequently adopted.

The lesions of simple ulceration may be single or multiple and located upon any part of the rectal wall. As seen through the proctoscope their distinctive feature, as compared with the specific and malignant types, is *shallowness*; they seem to extend superficially rather than in depth, the loss of substance being practically limited to the mucosa. The lesions are usually more or less regular in outline and do not present undermined or excavated edges. They are covered by a thin, purulent

secretion, which is easily wiped off, exposing a red, granular surface often resembling simple erosions or abrasions. If located entirely above the anal canal, the ulcers are painless to the touch.

But, however characteristic in appearance the lesions may be, it is always advisable to submit a specimen, preferably obtained with the curette, to microscopic examination. Nothing is lost by adhering to this policy as a matter of routine, and sometimes much of the greatest possible value is gained.

Prognosis.—Ulceration of the movable rectum is always to be regarded as a grave disease. Its tendency is never toward spontaneous recovery. On the other hand, if neglected or maltreated, stricture is the logical—I had almost said inevitable—sequence. When this result follows simple ulceration, as opposed to the malignant and certain varieties of the specific type, it assumes the form of fibrous stricture, one of the most serious and intractable of all rectal affections. In addition, the danger from the ulcerative process itself is not inconsiderable, broken rest and sleep from the tenesmus, the weakening effect of the chronic discharges, disturbance of the function of digestion, and progressive loss of strength and flesh combining to bring about a state of exhaustion from which recovery is both difficult and uncertain.

On the contrary, the disease is amenable to proper treatment, the response, as a rule, being prompt or slow according to the stage at which the treatment is begun. The prognosis in a given case may, therefore, be said to depend in a double sense upon its therapeutic management,—the promptness with which it is taken in hand no less than the skill and care with which it is handled.

Treatment.—Kelsey² says: "A case of severe or extensive ulceration of the rectum is perhaps one which calls for as much skill in the treatment and yields as poor results as anything in the range of surgery."

This statement is true, but rather misleading as applied to the average case of *simple* ulceration. The difficulties of treatment are many, but they are not insurmountable if certain basic principles are recognized and conformed to. If the views advanced upon etiology are correct, the most significant of these principles is also the most self-evident. In the presence of venous congestion repair takes place slowly, if at all, and it is sometimes almost impossible to induce the healing process. Relief of the venous congestion, therefore, is one of the first indications of treatment. This can only be accomplished

² Diseases of the Rectum and Anus, 4th edition, p. 310.

in one way, viz., by rest in the recumbent position. No halfway measures will suffice. If the case is at all severe the patient must go regularly to bed and remain there until the reparative process has become well established, whether it requires one, two, or six weeks. A strictly analogous pathologic condition is seen in varicose ulcer of the leg, the treatment of which by strapping and elevating the limb well illustrates the importance of this principle and at the same time suggests the explanation of its effectiveness.

Diet is another important consideration. It should be light but nourishing, and of such a character as will leave the least possible residue. Ordinarily a strictly liquid diet will be found best, particularly during the time the patient remains in bed.

In the beginning of treatment and as often thereafter as necessary the bowels should be thoroughly evacuated. A few broken doses of calomel may occasionally be indicated, but, generally speaking, castor



Fig. 54.—Powder insufflator.

oil is preferable to other laxatives in this condition. Care and discrimination are required in handling this phase of the treatment for the reason that the patient, mistaking the mucopurulent discharges for fecal movements, is apt to mislead his physician. Following the action of the oil or other laxative a small enema may be employed to soothe the bowel and cleanse the diseased surface of any fecal matter which may have found lodgment in passing.

Topical applications constitute the main dependence in the active treatment of the lesions. These are made through the proctoscope directly to the diseased areas and consist of a solution of nitrate of silver, pure carbolic acid, ichthyol, balsam of Peru, tincture of iodine, etc. Dusting powders, such as aristol, euophen, iodoform, calomel, and stearate of zinc, applied by means of the insufflator (Fig. 54), are of considerable value in some cases. Small injections of mild stimulative, astringent, or sedative remedies, preferably in oil menstrua, are sometimes useful adjuvants. Daily irrigations with mild antiseptic or stimulating solutions are often beneficial. When this measure is resorted to, care must be taken to avoid the possibility of carrying infectious material into the higher portions of the bowel. To this end the recurrent irrigator should always be used. When the reparative

process is established a solution of nitrate of silver (2 to 5 grains to the ounce) applied by means of the atomizer serves to promote it, and a 15 to 25 per cent. solution of argyrol applied freely on a cotton swab answers a similar purpose. Frequently the changes require to be rung from one class of remedial agent and method of application to another, and often the resources and ingenuity of the surgeon are sadly taxed.

It may prove of value to some to set down in detail the line of treatment which I have found most effective in the average case: After gently cleansing the mucosa with cotton swabs, I thoroughly cauterize each lesion with a 60 to 120 grain to the ounce (12 to 24 per cent.) solution of nitrate of silver, being careful to confine the application to the diseased surface. This is followed by a general application of the silver spray before the proctoscope is withdrawn. The application is repeated every other day or twice a week, according to the indications. The silver solutions in any strength are practically painless if confined to the movable rectum, and the most distressing symptom, tenesmus, is usually relieved, or at least greatly modified, by the first treatment. On the intervening days the following prescription is usually employed:—

R Bismuthi subnitratis ʒij.
 Ext. hydrastis fl. (non-alcoholic) ʒj.
 Ol. olivæ vel amygdalæ q. s. ad ʒvj.

M. Sig.: Shake the bottle and inject two tablespoonfuls at bedtime.

This is to be taken in the recumbent position and the patient instructed to retain it. If necessary to facilitate retention, a few drops (5 to 10) of deodorized tincture of opium may be added to the portion to be injected and the patient or attendant directed to hold a compress firmly against the anus for a few minutes. If, as occasionally happens, one or more of the ulcers prove obstinate after a fair trial of the above measures, I apply balsam of Peru, ichthyol, or even undiluted tincture of iodine to the offending lesion, daily, or as indicated. In a few instances I have found it necessary to carefully but thoroughly curette an indolent ulcer, using the sharp curette, after which healing has followed promptly.

Cases will occasionally be encountered, especially when seen in their early stages, in which a few applications of the 5 to 10 per cent. solution of nitrate of silver, together with regulation of the diet and attention to the liver function, will prove effective without putting the patient to bed. But such cases are exceptional,—most probably

because medical advice is usually not sought until the disease has become chronic and the various household and patent remedies for "looseness of the bowels" and "blind" or "bleeding" piles have been exhausted.

At whatever stage seen, attention to the general health should never be omitted. When least suspected the rectal trouble may prove to be but a local expression, sometimes indeed an advance sign, of some profound bodily dyscrasia. In the majority of cases a course of tonics and reconstructives will prove a valuable adjuvant to any line of treatment.

Certain desperate cases may from time to time be met in which the ravages of the disease cannot be stayed by the most skillful local treatment. Here colostomy would suggest itself as the only feasible recourse. It is doubtless extremely rare, however, for *simple* ulceration to assume such a phase.

SPECIFIC ULCERATIONS.

Dysenteric Ulceration of the rectum as met with in temperate climates is practically limited to the amebic variety. This will be fully discussed in the succeeding chapter.

Venereal Ulceration.—It is not intended to enter into an extended consideration of ulceration due to venereal infection. There are many mooted points bearing upon the subject which, while not without interest, it would be profitless to discuss in this connection. In certain foreign countries where the various forms of sexual perversion are prevalent, venereal ulcerations of the rectum are frequently encountered. In our own country they are by no means unknown,—to be entirely candid, are doubtless much more common than is generally admitted, though the disgusting nature of the practices underlying them would well excuse a disposition to deny their existence.

The ulcerations belonging under this head may be caused by any one of the three forms of venereal infection, chancroid, gonorrhea and syphilis.

Chancroidal ulceration of the anoperineal region is quite frequently observed. That it is found also in the rectum proper is attested by many clinicians. Among females of loose character and uncleanly habits the anatomic relations of the parts and the possibility of accidental contact of the male organ in coition offer ready explanation of its occurrence in the former locality. Since, however, the barrier offered by the sphincter muscles and the direction of peristalsis render it improbable that infection would extend from the anus into

the movable rectum, its occurrence in the latter situation can only be explained upon the hypothesis of indulgence in unnatural practices.

The lesion presents the same physical characteristics here as when located upon the genitals. On account of the irritation of the feces phagedena is more likely to occur, and for the same reason pain may be a conspicuous symptom. With this exception the symptoms do not differ from those met with in other forms of rectal ulceration. The treatment involves the same principles as the treatment of chancroid elsewhere (cleanliness, antiseptics, cauterization, etc.), with such modifications as the location of the lesion and the function of the part may suggest.

Gonorrhea.—It was formerly contended that the rectal mucosa was immune to the action of the gonococcus. This contention has been abundantly disproved by a host of more recent observers. In the large metropolitan clinics where exact methods of diagnosis are habitually employed it is now by no means rare for gonorrhea of the rectum to be demonstrated.

As in the case of the chancroid, it is necessary for the infection to be conveyed directly to the rectal mucosa. If ingress of the infectious material were obtained by unaided extension from the anus, the disease would be so prevalent among a certain class of the female population of every community as to occasion no special comment. Introduction of the contaminated finger, syringe-tip, or other instrument, and the practice of sodomy are the means by which the primary inoculation is effected.

In acute gonorrhea of the rectum the action of the virus ordinarily does not extend deeper than the mucosa, the resulting lesions being in the nature of superficial abrasions or excoriations. When for any reason it becomes chronic, however, deep and extensive ulceration may be produced and stenosis follow cicatrization, just as in the urethra.

The symptoms of gonorrheal proctitis and ulceration are not distinctive. In the acute stage the pain is apt to be greater, the constitutional involvement more pronounced, and the discharge more profuse and of a greenish hue. Microscopic examination of the pus is the only means by which a positive diagnosis can be made, and should be employed in all suspicious cases. In fact, there is reason to urge that this method be resorted to as a matter of routine in determining the nature of pathologic discharges from the rectum. Unexpected information of much value both to patient and physician will often more than compensate for the extra trouble.

The treatment is practically the same as that for similar non-

specific conditions with one important exception, namely, that irrigations are contraindicated because of the danger of carrying the infection into the higher portions of the bowel. When the tender condition of the anus will not permit of introduction of the proctoscope it is well to give attention to this region first, in the mean time being content with the injection into the rectum of small quantities (one to three ounces) of the medicinal solution desired. Frequent careful cleansings of the infected area by means of the recurrent irrigator are permissible and beneficial. As soon as the condition of the anus will allow, topical applications under direct inspection should be instituted. Solutions of the silver preparations, argyrol, protargol, argonin, and the nitrate, will generally prove the most speedily effective agents for this purpose.

Syphilis.—The appearance of a chancre upon the rectal mucosa is usually regarded as *prima facie* evidence of sodomy. It is very rarely seen in private practice.

Mucous Patches, also, though of common occurrence about the anal orifice, are seldom observed within the rectum proper. It is not improbable that the majority of cases so reported were ulcers resulting from superficial abrasions which, because they occurred in syphilitic subjects and because of their resemblance to the more familiar lesions observed in the anal region, were called mucous patches.

Ulceration of the rectum due to syphilis may be met with in any stage of the disease. By far the larger number of cases appear as late manifestations,—sometimes months or even years after all symptoms of the original disease have disappeared. It is a remarkable fact that syphilitic lesions of the movable rectum are comparatively painless and, unless by accident mucus and blood are observed in the stools, the patient's attention is often not called to this organ until stenosis occurs.

The exact nature of the preliminary pathologic changes in the gut wall is still a much debated question. An exhaustive discussion of the various views which have been advanced upon the subject would be without profit. Reasoning from what is definitely known of the activities of syphilis in the tissues of more accessible regions, we may conclude that the pathologic processes which result in ulceration of the rectum are, in the main, of two kinds: first, a low grade of inflammation due to cell-infiltration of the submucosa which results in obliteration of the blood-vessels and necrosis; second, the breaking down of localized gummatous deposits. The author has never seen a case of anorectal syphiloma as described by Fournier and corroborated by many later writers.

As ordinarily seen, ulcerations of the first-named kind involve extensive areas, are rather superficial in character, and the underlying tissues are dense and inelastic, with a tendency to contraction already manifest. The second kind are more limited in extent, but much more deeply destructive of the subjacent tissues, often, indeed, laying bare the sacrum or penetrating into the vagina, prostatic urethra, or peritoneal cavity, depending upon the location of the lesion. Clinically any attempt to identify these ulcerations as secondary or tertiary, in accordance with the accepted nomenclature of the separate stages of syphilis, is entirely futile. It should be said in this connection that not every ulceration of the rectum occurring in a syphilitic is necessarily of syphilitic origin. The judgment and efficiency of the physician may be seriously handicapped by failure to recognize that a history of syphilis, however unmistakable, does not preclude the possibility of disease from other causes.

The **symptoms** are much the same as those observed in other forms of ulceration. The discharges are usually more profuse and more distinctly purulent; and, especially after the onset of stenosis, relaxation of the sphincters and hypertrophy of the radiating folds about the anal margin are frequently seen. The appearance of this region, due to the last-mentioned causes, is regarded by many as characteristic of syphilitic ulceration. It must be remembered, however, that chronic irritating discharges of any kind are capable of producing a low grade of inflammation with hypertrophy of the anal tissues, and that a patulous condition of the sphincter is an evidence rather of stricture than of ulceration.

Treatment.—Specific medication is of doubtful value, but should always be tried. In the vast majority of cases the rectal lesion is properly to be regarded as a sequel of the constitutional disease, and there is little more reason to expect benefit from antisyphilitic remedies in this case than in that of locomotor ataxia of similar remote origin. In cases in which the Wassermann reaction proves positive, salvarsan or neosalvarsan in full dosage should be administered; but the instances will be very few in which material improvement of the local lesion will follow any kind of systemic medication.

The principles of treatment of syphilitic ulceration are the same as those laid down for simple ulceration, with one important addition. The tendency to stricture formation in the specific form of the disease is marked and obstinate from the beginning, requiring the most vigilant and persistent attention to control. This tendency cannot be overcome, but remains a menace throughout the after-life of the patient. As soon as the ulcerations have been healed, or even before, when necessary, the introduction of the full-sized Wales bougie should be begun. Ordinarily twice a week will be often enough; but, as before intimated,

PLATE IX.



Tuberculous ulceration destroying both sphincters and the ischioanal fossa. Entire posterior wall of rectum destroyed by ulceration. (Case of *Dr. C. F. Martin*.)

its use can never be safely abandoned. For this reason the operation of excision of the portion of the bowel involved is rapidly growing in favor.

In some cases it will be found impossible to cure or even curb the disease process by local measures. Colostomy will here present itself as a life-saving procedure. In such cases the operation should always be done with the idea of later on, if it should prove to be necessary, removing the offending section of gut and restoring the normal route for the feces.

Tuberculous Ulceration.—Ulceration of the rectum in tuberculous subjects is divisible into two distinct clinical groups: (1) ulceration of

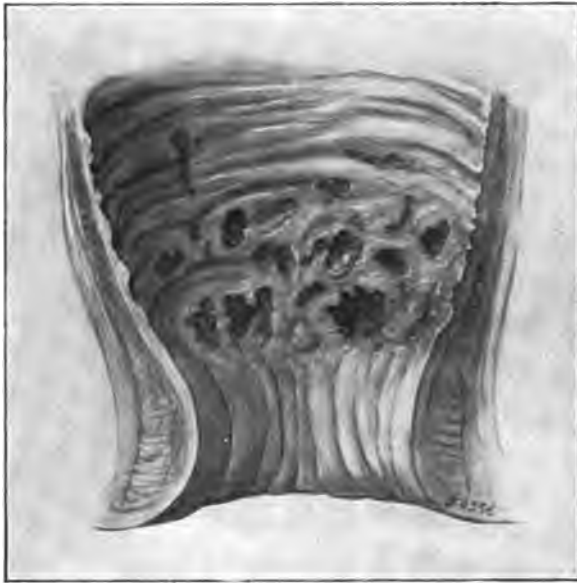


Fig. 55.—Tuberculous ulceration.

any of the varieties previously described occurring in the victims of pulmonary tuberculosis; (2) ulceration which is itself tuberculous, *i.e.*, due to the local action of the tubercle bacilli. Cases of the first class are not uncommon; but, overshadowed in importance by the more formidable constitutional affection, the rectal symptoms are often either ignored or erroneously interpreted. It is quite probable that many cases beginning as simple ulcerations have become secondarily infected from swallowed sputum, and thus any hope of the patient's ultimate recovery been sacrificed. This danger and the further consideration that ulcerations of every kind sap the strength and lower the vitality, are sufficient reasons for urging especial care and alertness when rectal symptoms are complained of by a tuberculous patient (Fig. 55).

True tuberculous ulceration of the rectum is a rather frequent disease, as might be inferred from the widespread prevalence of the "great white plague." It is found more often in men than in women, and, like pulmonary tuberculosis, is largely a disease of young adult life. It may, *rarely*, occur as a primary process, or, as in the vast majority of instances, be a secondary infection from a pre-existing lung involvement.

Of all portions of the intestinal tract the rectum and sigmoid flexure are far the most frequently implicated. This naturally follows from the physiologic function of the parts, for it is only in the distal portion of the large bowel that the germ-laden feces are likely to remain for any considerable length of time in contact with the mucosa. It is easily conceivable that an atrium for the entrance of the tubercle bacilli is presented somewhere in the terminal section of the gut during the course of every case of pulmonary tuberculosis. But it is not necessary to presuppose this, since it has been demonstrated that the normal mucosa is not proof against their invasion.

Tuberculous ulceration is characterized by tissue destruction, deep and often extensive, with little or no tendency to cicatrization. The individual lesions in the early stages may be very numerous from the breaking down of a number of separate tubercle deposits; but these soon coalesce and, as ordinarily seen, only one or two large areas of ulceration, perhaps entirely encircling the bowel, remain. The ulcers are excavated and soft to the touch, with undermined and thickened margins. The surrounding mucosa is not as a rule acutely inflamed and tenesmus is not a prominent symptom. In case of doubt the diagnosis may be confirmed by the microscope or by growing cultures of the bacilli. In order for the findings to be reliable, however, the specimen so examined should be obtained by curetting an ulcer, preferably near the edge where the process is most active. Usually the characteristic appearance of the lesions considered in connection with the coexisting pulmonary disease will render possible an accurate diagnosis without resort to laboratory methods.

Treatment.—The treatment of simple ulceration of the rectum occurring in the victims of pulmonary tuberculosis calls only for such modifications as the nature of the more serious constitutional disease may suggest. The most important of these refers to confinement to bed. Of course this should not be advised when possible to avoid it, and never for a longer period than is absolutely necessary. If the patient's general health can be built up and tuberculous infection of the intestinal lesions is escaped, it will be found that the results of treatment, while more slowly effected, are little less satisfactory than in the ordinary case.

The treatment of rectal tuberculosis, on the contrary, is a very different proposition. In the rare cases in which the local infection occurs as a primary process the effort may be made to prevent dissemination of the bacilli by destroying them *in situ* by means of the actual cautery or strong chemical caustics, thus converting specific into simple lesions. It is recognized that the carrying out of this suggestion will sometimes involve grave danger. But the dangers of the disease itself are even graver, and an occasional success in the saving of a life will more than justify many failures.

When, as is the rule, tuberculosis of the rectum exists in a tuberculous subject, little is to be anticipated from treatment of any kind. Here palliation instead of cure becomes the chief aim of treatment. Antiseptic irrigations and soothing applications promote the comfort of the patients and should be frequently employed.

The tuberculin treatment has given good results both in the primary and secondary forms. This method of treatment is yet in the experimental stage, but at the present time seems to be the most promising and hopeful therapeutic resource in these otherwise practically hopeless cases.

CHAPTER VIII.

Amebic Ulceration of the Large Intestine (Amebic Dysentery).

THE title "Amebic Ulceration of the Large Intestine," instead of the more customary "Amebic Dysentery," has been chosen for this chapter with the purpose of emphasizing several points of vital importance to a clear comprehension of the subject:—

First.—The essential feature of the disease process is always ulceration. Inflammation of the mucosa more or less general, loose stools, mucous and bloody discharges, etc., are usually associate phenomena, but they are properly to be regarded as incidental or secondary, and in no sense distinctive.

Second.—The characteristic lesions of the disease are always found in the large bowel. The consensus of opinion among authorities is that the primary site of invasion is the cecum, whence the infection is carried by natural forces throughout the colon and rectum. Involvement of the distal portion of the ileum is occasionally mentioned in autopsy reports, but clinically this possibility may be, and usually is, ignored.

Third.—In the majority of cases there are no constitutional symptoms except such as may be properly considered secondary to derangement of the bowel function. Impairment of the general health is a sequel, not an inherent part of the pathologic process.

The disease is therefore to be regarded as a local, not a general, systemic disease, and may be tersely defined as *a chronic ulcerative affection of the large intestine due to the local action of the Amœba dysenteriae (Entameba histolytica, Schaudinn).*

It is extremely unfortunate that the term "dysentery" should ever have been applied to this affection, for the reason that it so often leads to confusion and error with respect to the therapeutic management. In the traditional teachings as to the treatment of dysentery, whether acute or chronic, medication by the mouth was uniformly stressed as all-important, and all-sufficient; and in spite of our present-day enlightenment upon the subject, the profession seems strangely reluctant to abandon the old fallacy. The very name, dysentery, still, with lamentable frequency, suggests a therapeutic routine which begins with calomel and the salines, includes opiates, astringents and intestinal antiseptics, and ends with bismuth and ipecac. Often there is no other symptom than

bloody discharges from the bowel upon which to base the diagnosis, and sometimes, sad to relate, there is only the statement of the patient that he has "bloody flux." Happily the modern teaching upon this point is clear and emphatic. It is now well understood that the passage of blood from the rectum may be due to a wide variety of causes in no way related to dysentery, and the necessity of a careful physical examination in every case has come to be recognized as a sacred obligation.

The past decade has witnessed a remarkable increase in the prevalence of this type of infection in the United States. The opinion has been advanced by a number of writers that the explanation of this fact is to be found in the close relations with tropical countries incident to and growing out of the Spanish-American War. While it is doubtless true that the disease is much more common now than formerly, I am convinced that its appearance in this country, particularly the Southern portion, antedated the time referred to. As I recall my own earlier experience I do not doubt that I saw and treated many cases the true nature of which I failed to recognize at the time.

It is true, however, that a large proportion of the literature upon the subject has been produced in the very recent past. Musgrave and Clegg, Craig and other medical officers stationed in the Philippines, and Flexner, Councilman, Osler, Dock and others in this country have made notable contributions. More recently Deeks and Shaw¹ and Herrick,² writing from the Canal Zone, and various observers in widely scattered portions of the United States have added largely to our knowledge of the disease.

The terms "amebic dysentery" and "amebiasis" are the ones ordinarily employed to designate the affection. As a matter of fact the particular designation of a disease process is of little moment aside from the possibility it may present of misleading the unwary. For convenience these designations will be used in the following pages, but always in the light of the restrictions and definition set down in the opening paragraphs of this chapter.

The careful student of the literature cannot fail to be impressed with the obvious fact that two very different types of the disease are described under the same name by the several writers upon the subject. Those writing from tropical countries speak of *acute*, virulent, and often rapidly fatal cases, such as are met with rarely, if at all, in the United States proper. Here the type of the disease encountered is almost uniformly chronic, the exacerbations it presents from time to time, while

¹ Medical Record, Nov. 13, 1909.

² *Ibid.*

acute, being so only by comparison with the much longer latent, quiescent, or mildly active periods.

ETIOLOGY.

At the present time it seems to be well established that at least two distinct varieties of the ameba are found in the intestinal tract of man,—the pathogenic and the non-pathogenic. Following the classification of

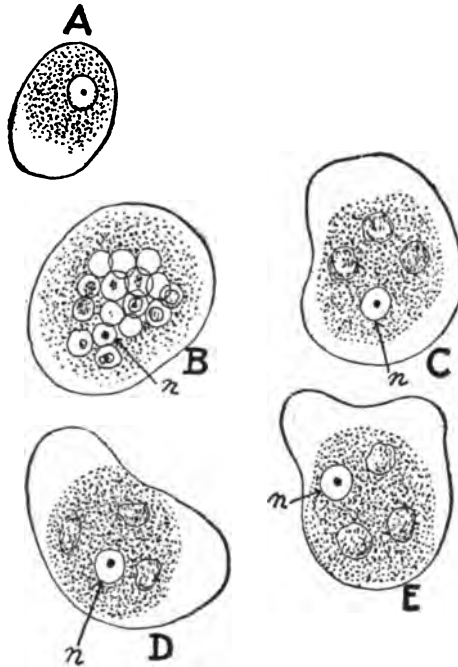


Fig. 56.—Ameba hystolytica. *A*, young spermine; *B*, older spermine with ingested blood-corpuscles; *C*, *D*, and *E*, three forms of living ameba, with three corpuscles and one nucleus, showing change of form and ectoplasmic pseudopodia; *n*, nucleus. (After Jurgens.)

Schaudinn, these are known respectively as the *Entamoeba histolytica* and the *Entamoeba coli*. The latter is said to be a normal and perfectly harmless colonic guest in more than half of the inhabitants of the Philippine Islands.

The *Entamoeba histolytica* is now generally accepted as the pathogenic form of the protozoa, and is said to permit of ready laboratory differentiation from the harmless variety (Fig. 56).

The most interesting question connected with the etiology at present has reference to the pathogenicity of the ameba. Two very different

opinions are entertained upon the subject. By some it is contended that the amebæ are not the active causal agents, but that the bacteria invariably found in association with them are the real pathogenic factors. The other and increasingly larger group of observers holds that the bacteria are accidentally present and that, while they may modify and complicate the disease process, the amebæ are always the primary morbid agents. The latter view seems the more reasonable one when we remember that bacteria are normally found in the intestinal tract of man, where, as a rule, their effect is a beneficent one. On the other hand, amebæ, the variety known as *Amebæ histolytica*, at any rate, are not met with except in diseased conditions. Since bacteria alone do not produce lesions, and this type of amebæ is only found in connection with lesions, it would appear that the causative relation of the latter is at least presumptively established. Of course, when a solution of continuity of the intestinal mucosa is once started it is immediately invaded by bacteria; but, assuredly, in such case these organisms cannot be considered as other than secondary or complicating factors.

Another point of controversy is as to whether or not the amebæ are capable of invading a sound mucosa. There is evidence in support of the view that the pathogenic variety is capable of doing so. But it is not necessary to concede this to make out the case against them. With the function of the larger intestine in mind the probability that the mucosa is often injured (minute epithelial abrasions) in the course of every individual's life must be admitted. Yet such injuries rarely result in recognizable pathology from bacterial action; they seldom escape when the disease-producing protozoa gain access to them. We may therefore conclude that, even though an initial lesion must be presupposed, the distinctive nature as well as the gravity of the affection are determined by the ameba.

SYMPTOMATOLOGY AND DIAGNOSIS.

The symptoms of amebic ulceration of the large intestine do not differ from those due to ulceration from other causes as set forth in the preceding chapter. Loose stools; discharges of mucus, pus, and blood; tenesmus; abdominal distention; loss of appetite, strength, and flesh; progressive anemia, etc., are the phenomena common to all forms of ulceration of the large bowel, but characteristic of none. It remains, then, in every case to institute a thorough local examination both to determine the site and extent of the trouble and to differentiate its exact nature. It is notably true of this affection that the rectum and sigmoid are practically always involved, certain of its most distressing symptoms, *e.g.*, tenesmus, being primarily due to this fact. With the use

of the perfectly simple modern methods of examination, the direct inspection of these parts presents no difficulties.

Lesions of the amebic type are so characteristic in appearance that their recognition is easy by any one who has ever before examined a case (Plate X). The ulcers are variable in size, number, and location, and covered with white or dirty-gray pellicles the removal of which leaves bleeding surfaces. In shape they are irregular, but usually show a tendency to extend in the direction of the circular muscular fibers, thus assuming an elongated, or linear, rather than an oval outline. Except in old, neglected cases the lesions do not extend deeper than the submucosa, but present undermined edges and not infrequently are connected by submucous tracts. The free margins and proximal surfaces of the rectal valves seem to be favorite sites of invasion.

But, while the clinical picture is often—I may say generally—sufficient for a diagnosis, it is strongly advisable that the confirmatory evidence of the microscope be sought in every case. This involves no great outlay of time or trouble, and requires no special laboratory training. It is only necessary that the slide be warmed to approximately body temperature and the cover-glass pressed well down upon the specimen so as to spread it thinly and uniformly. When present the amebæ with their characteristic movements are always the most conspicuous objects in the field.

In order for the microscopic examination to be of real value in the diagnosis, it is of great importance that the specimen be properly obtained. Neither mucus nor feces are reliable for this purpose. Amebæ *may* be found in them, but their presence is more or less accidental and their absence without diagnostic significance. The only reliable method of obtaining a specimen is by curetting an ulcer under direct inspection through the proctoscope, the scraping being transferred to a slide and handled as though it were merely mucus. If the case is one of amebic infection the organisms will rarely fail to appear in such a specimen.

Of course, when no ulcer is available from which to obtain a scraping, mucus or feces should be utilized for the purpose. It is worthy of renewed emphasis, however, that in such event too great weight is not to be attached to negative findings, even after repeated examinations.

Another aid to diagnosis, but one of only corroborative value, is the leucocyte count. Leucocytosis is usually present and is closely proportionate to the degree of inflammation and the amount of tissue destruction. By this means some knowledge of the patient's power of resistance may be gained, and so, in doubtful cases, assist in determining upon the best plan of treatment.

PLATE X.



Superficial ulceration of the colon
in amebic dysentery.



Deep ulceration of the colon
in amebic dysentery.

PROGNOSIS AND COMPLICATIONS.

The disease is always to be regarded a serious one, and the patient should in the beginning be impressed that the outcome of his case will depend in large measure upon his co-operation in the treatment.

Strange to say, a certain very small percentage of cases seems to run a self-limited course, permanent recovery after one or several attacks following without treatment. On the other hand, some cases prove obstinately intractable from the outset, and a fatal termination from toxemia, exhaustion, or some complication results in a few weeks. This latter type of the disease is, however, rarely seen outside of tropical countries.

Generally speaking, the prognosis may be said to be favorable. This is especially true when the treatment is begun early and faithfully carried out by the physician himself.

By far the most frequent complication is abscess of the liver. Statistics differ very greatly on this point; but it is probably not far from correct to say that this complication occurs in approximately 5 per cent. of all cases and in more than 50 per cent. of fatal cases. It is only necessary to recall that the return circulation from the large intestine is conveyed by way of the portal vein, to appreciate this danger. Amebic abscess of the brain, lungs, and other organs is also occasionally encountered.

Perforation of the gut wall leading to fatal peritonitis is sometimes met with, though not so often as might be expected when the essentially ulcerative character of the disease is considered.

Another complication, or, more correctly speaking, sequela, is distortion of the intestine from vicious cicatrization. This may take the form of one or several strictures at different sites, or extensive areas may be involved, resulting in partial or complete obstruction. The after-effects of the disease may thus easily prove more dangerous to life than the disease itself.

TREATMENT.

The treatment of amebiasis may be considered under three heads: *general*, *local*, and *surgical*.

General Treatment includes (1) rest, (2) diet, (3) hygienic and sanitary measures, and (4) medication by the mouth.

1. *Rest* is always of great importance. Ordinarily time will be saved by confining the patient strictly to bed until the disease has been gotten under control. This may require only a few days or several weeks, depending upon the severity of the case; but treatment

begun in this way will be far more promptly effective than if the patient continues upon his feet.

2. *Diet* is also a matter of importance. For a few days it may be well to restrict the nourishment to liquids given in small or moderate quantities at frequent intervals. I am convinced, however, that serious error is often committed in this connection. These patients usually come to us weak, emaciated, and semistarved from their own efforts at dieting, and one of the urgent indications is to nourish them as soon and as rapidly as possible. This can generally be done, even in severe cases, much earlier than is customary by devoting due care and attention to the subject. In addition to the predigested foods, peptonized milk, junket, etc., it has been my observation that in the majority of cases thoroughly browned toast, juice expressed from fresh beef, and soft-boiled eggs are well borne. Fruits, sweets, and all but the simplest foods should be withheld.

3. *Hygienic and sanitary measures.* Hygienic measures refer to the patient himself and include fresh air, sunshine, cheerful surroundings, etc. In obstinate cases a change of climate may prove beneficial through its effect upon the general health.

Sanitary measures refer more particularly to the protection of the patient's family and the community in which he lives. The nurse or attendant should be given explicit instructions as to the necessity of destroying all discharges from the bowel, and also as to the thorough cleansing of the hands after waiting upon the patient. The infectious organisms are doubtless in the main water-borne, and the danger of contaminating the water supply should be fully explained to all concerned.

4. *Medication by the mouth.* Referring first to the so-called specific medication,—holding as I do most firmly that this disease is purely a local affection of the large bowel, I cannot believe that ipecac or any other medicinal agent administered by the mouth will retain sufficient potency, after traversing the twenty-odd feet of small intestine, to exert a destructive effect upon the amebæ when they are finally encountered. If this principle were correct, it would seem that the practically unanimous verdict of authorities with reference to the inefficacy of the antiseptic treatment of typhoid fever would, to say the least, be inconsistent. I am aware that the ipecac treatment is lauded by many whose opinions are entitled to all respect. But it must be remembered that the drug alone has not been relied upon by them. On the contrary, their reports uniformly show that dietetic and hygienic measures, as well as irrigations, have been coincidentally employed. From my point of view these latter were in reality the

effective agencies. I would interpose no special objection to the use of ipecac; but I would strongly urge that, in the light of our present knowledge, dependence upon it to the exclusion of other measures and methods of treatment is both unwise and unwarranted.

For the benefit of any who may wish to try the ipecac treatment it may be stated that the dosage usually employed is from 10 to 15 grains of the powdered drug in capsule every four hours during the first day and at longer intervals during the two following days. It is recommended that it be given on an empty stomach following an efficient purge, and by some that a preliminary hypodermic of morphine be administered to obviate emesis. Salol-coated or other forms of enteric pills may be employed to advantage.

Recently a new and most promising modification of the ipecac treatment has been announced by Rogers,³ of Calcutta. In this method hypodermic injections of the soluble salts of emetine are employed. The author reports several series of cases treated exclusively by the hypodermic administration of emetine hydrochloride, with the most striking and uniform success. His conclusions have been corroborated by a number of observers in this country, notably Lyons,⁴ of New Orleans. Should this method of treatment prove, on further trial, to be all that is claimed for it, a difficult problem will have been happily solved. The remedy, emetine hydrochloride, is given in doses of 1 to 3 grains daily until the amebæ disappear and the stools become normal. No untoward effects of any kind have been reported from the use of the drug, the action of which seems to be selective for the pathogenic organisms. It may be used intravenously without danger, but causes no local irritation and yields as good results when injected subcutaneously.

Speaking generally, the exhibition of medicine by the mouth should be resorted to only in the presence of well-defined indications. The routine administration of any remedy is to be condemned. In the beginning and from time to time during the progress of the case benefit may be expected from a mild mercurial purge. Occasionally an opiate may be required, though extreme caution should be exercised upon this point. Intestinal antiseptics sometimes seem to be useful, acting by inhibiting fermentation and preventing toxemia, rather than by any special germicidal effect upon the offending protozoa. Among the more reliable agents of this class salicylate of bismuth, betanaphthol, thymol, resorcin, and salol may be mentioned. The first-named in my experience has proved the most dependable.

³ British Med. Journal, June 22, 1913, p. 1424.

⁴ Jour. Amer. Med. Assoc., April 19, 1912, p. 1216.

It is interesting to note in this connection the enormous doses of bismuth subnitrate recommended and employed at the Ancon Hospital. Deeks and Shaw⁵ habitually give a dram to a dram and a half by measure (3 drams by weight) every three hours for days in succession, and report remarkable curative results. It may be that the disease as met with in the Canal Zone is of a peculiar type, or perhaps those who contract it have peculiar constitutions. Certainly no such heroic dosage would be countenanced in the treatment of this or any other affection in this country.

Local Treatment.—The local treatment may be considered under two heads: (1) topical applications, and (2) colonic irrigations.

1. *Topical applications.* Undoubtedly in the average case the greatest single factor contributing to the patient's discomfort is the tenesmus. This it is which, in spite of the pain, forces him to seek the commode at short intervals, only to obtain momentary relief by passing a small quantity of blood-stained mucus and pus. The result is that sleep is broken or rendered impossible, food is refused because it excites peristalsis, and strength is rapidly exhausted. This state of affairs is as unnecessary as it is deplorable. Tenesmus is a rectal symptom, due in this disease to the inflammation and ulceration practically always to be found in this organ. Now, when we reflect that the rectum throughout is as accessible to sight and touch as the pharynx, or, indeed, as any corresponding area upon the surface of the body, the term unnecessary as applied to this symptom and its sequelæ is entirely justified. Topical applications to the diseased parts act like magic. Nitrate of silver is so far superior to other remedial agents for the purpose that no other need be mentioned. The proctoscope, of small size, should be gently introduced, the mucosa carefully cleansed, and each ulcer touched with a solution of silver nitrate, 60 to 120 grains to the ounce. Before withdrawing the instrument a general application of the same agent, 3 to 5 grains to the ounce, may be made by means of the atomizer. The treatment should be repeated daily until the symptom is under control; thereafter according to indications. The ulcers will be found to heal with remarkable rapidity and the further management of the case be greatly simplified. I have many times known a single application to entirely change the patient's outlook on life.

2. *Colonic irrigations.* With the large majority of clinicians irrigations constitute the main dependence of treatment. A wide diversity of opinion exists as to the most effective solution, one man

⁵ Medical Record, Nov. 13, 1909.

advocating one kind, another another. Personally, I believe that the value of irrigations depends rather upon the mechanical cleansing action of the solution than upon any medicinal agent it may contain. And I believe also that failure to cure a case by this method of treatment is due alone to inability to reach all infected portions of the bowel with the solution.

The intolerance of the rectum due to the local inflammation and tenesmus renders it impossible in many cases, even with the aid of posture, to force the fluid into the higher portions of the gut. The only means by which this difficulty can be overcome is the introduction of the colon tube. In spite of emphatic claims to the contrary, I have no hesitation in asserting that this is a most difficult feat as ordinarily attempted, the tube curling upon itself in the rectum, thus leading to misapprehension as to the height it has actually reached.



Fig. 57.—Simple apparatus for coal-oil irrigation.

By placing the patient in the knee-chest or inverted posture and inserting the six-inch proctoscope to its full length the manipulation is rendered both easy and accurate, the tube being introduced through the proctoscope well into the sigmoid, and the proctoscope then withdrawn. At first the irrigations should be used daily or twice a day. Later, as the patient improves, every other day or twice a week will be often enough. In order to be effective not less than a half-gallon of the solution should be carried into the bowel before any portion of it is allowed to return, and the treatments should not be discontinued for several weeks at least after the cure seems complete.

The medicinal agents employed in the irrigating solutions include boric acid, quinine, ichthyol, common salt, hydrastis, formalin, etc. Cold water (50° to 60° F.) alone has some advocates. My preference is for the formalin in boric acid solution, beginning with one dram to the half-gallon and increasing the strength gradually as tolerance is acquired. A strength in excess of one dram to the quart can rarely be borne.

G. S. Hanes⁶ has called attention to the wonderful curative effect

⁶ Jour. Amer. Med. Assoc., June 19, 1909.

of ordinary coal-oil as an agent for irrigation, claiming that it is promptly destructive to the amebæ, soothing and healing to the diseased mucosa, and absolutely non-toxic in any amount. He recommends that a quart or even more of the pure oil be introduced into the bowel and the patient encouraged to retain it as long as possible each time (Fig. 57).

During the past several years I have employed this method of

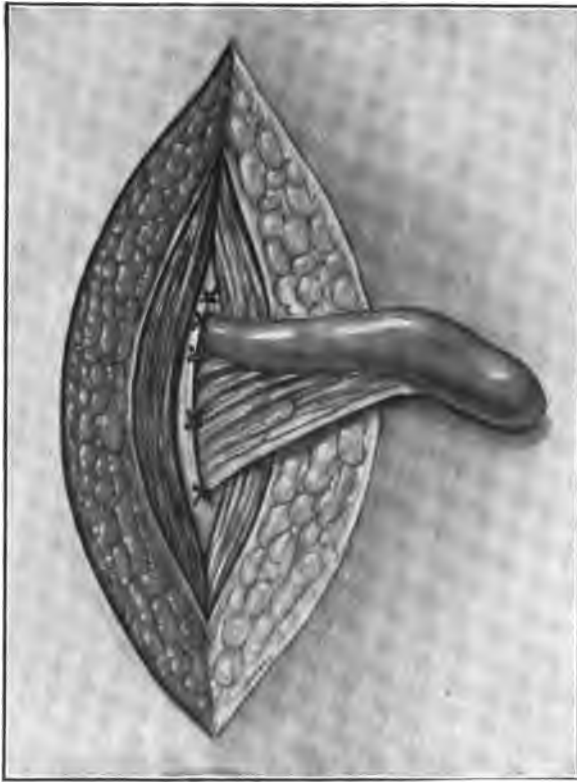


Fig. 58.—Appendicostomy, appendix brought out and anchored.

treatment in quite a large number of cases, probably 40 or 50, and desire to state that it has more than fulfilled expectations. In fact, used in a number of cases to the exclusion of all other treatment for the purpose of testing its value, I have been surprised and gratified at the uniformly favorable results obtained. In the light of this experience I have come to regard coal-oil as the most efficacious of all agents for irrigation. Three to five pints may be used at a time, being poured into the bowels through a funnel attached to a rectal tube which has been introduced into the sigmoid through the proctoscope. The patient should

remain in bed for several hours following the treatment and be instructed to retain the oil as long as possible. Every other day and later twice a week will be often enough to repeat the treatment.

In some cases it is not impossible to completely irrigate the colon with no other tube than the ordinary two-inch syringe nozzle, *provided* the rectum is first given careful attention and the proper posture of the patient secured.

Surgical Treatment.—Resort to surgery in the management of this disease is warranted for one purpose only, namely, to provide a means

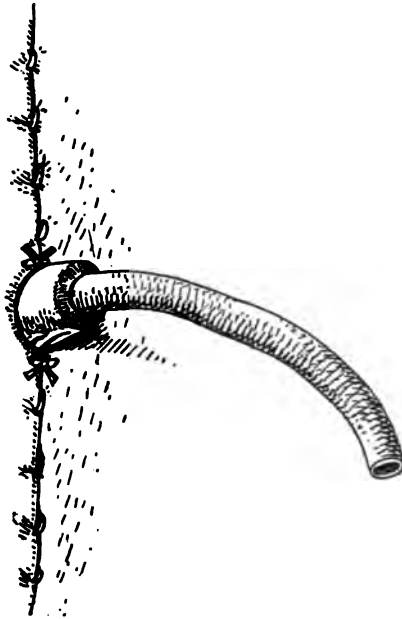


Fig. 59.—Appendicostomy, appearance of wound when healed (appendix amputated, tube in place).

of irrigating the entire large intestine when for any reason this is impossible per rectum and the infection is proved to exist at a higher level than can be reached from below. With its scope thus defined, it is obvious that it will be indicated in only a limited number of cases.

The operation of choice is appendicostomy in which the appendix is utilized as a conduit for the irrigating solution. This procedure was first employed by Dr. Robert F. Weir, of New York, in 1902. It has since been resorted to by many operators in a variety of cases and its value fully established.

The technique of the operation is exceedingly simple, it can be very quickly performed, and is practically free from danger. The appendix

is brought out through a short muscle-splitting incision and the cecum drawn well up in contact with the parietal peritoneum, to which it is anchored by one or more sutures passing through the mesoappendix. Another fixation suture is placed opposite the first, taking up both edges of the peritoneal incision and the serous and muscular coats of the base of the appendix (Fig. 58). The remainder of the incision is then closed in the usual way. If there is no reason to doubt the permeability of the appendix, it is probably wisest not to open it for several days, though when this seems advisable it may, with proper precautions, be safely done. When the adhesions have become sufficiently firm (three or four days) the appendix is cut off about one-half inch from the skin and a soft-rubber catheter of suitable size passed into the cecum and retained in place constantly during the first week or ten days (Fig. 59). In order not to interfere with the nutrition of the appendix it is important not to sever the mesoappendix even partially, if it can be avoided.

When by reason of anatomic abnormality or pathologic change the appendix is found to be unsuited for the purpose intended, resort may be had to cecostomy, which, though not so simple in technique, is neither a difficult nor a dangerous operation, and answers the same purpose.

The solutions for irrigation following appendicostomy are the same as those mentioned for use per rectum. It is worthy of remark in this connection that benefit apparently follows the use of plain water as promptly as the medicated solutions, seeming to prove that the effect depends rather upon the mechanical action of the fluid than upon its antiseptic action.

The *indications* for appendicostomy are just two in number:—

1. Failure to relieve by non-surgical methods faithfully and intelligently applied.

2. Recurrence of the attacks at such frequent intervals as to demonstrate that certain foci of infection exist in the higher portions of the gut which cannot be reached by irrigations per rectum. But it should be most earnestly insisted that the operation, if favorably considered, be resorted to in time and not reserved for moribund patients. Performed under proper conditions and by competent operators, it should give no larger mortality than the interval operation for appendicitis, which at the present time is practically *nil*. On the other hand, the disease itself is by no means free from danger to life, the single complication of amebic abscess of the liver and other internal organs causing a far higher mortality than that of appendicostomy.

Obviously appendicostomy is not a curative procedure *per se*. But that it offers a means—in certain cases the only available means—of cure is the positive verdict of many competent and credible observers. Of

course, the irrigations should be kept up for a sufficient length of time to effect a cure,—not less than six months or, better, twelve; and of course, a cure following the operation cannot be expected to preclude the possibility of a reinfection.

In conjunction with the through and through irrigations the rectum should continue to receive careful attention, any persistence or recurrence of tenesmus or other significant symptom being met by prompt and thorough local treatment.

CHAPTER IX.

Anal Fissure (Irritable or Painful Ulcer)—Other Forms of Anal Ulceration.

FISSURE differs so radically and in so many ways from all other ulcerative lesions met with in the anal region that it deservedly occupies a class by itself. This class, however, should not be arbitrarily restricted to include only lesions of a certain shape. True, the word fissure (Latin, *fissura*) means a slit or crack, and either of these definitions well describes the physical appearance of the average case. But other features—*i.e.*, pain, sphincter spasm—are far more distinctive of the affection and should determine the question of classification. Not all ulcers of the anal margin, even though within the grasp of the sphincter muscle, can be called fissures without doing violence to the real meaning of the word; and, on the other hand, a lesion truly fissure-like in shape may exist in this locality without giving rise to pronounced pain. The term irritable or painful ulcer, therefore, is a much more accurately descriptive designation and will be employed interchangeably with fissure in this chapter.

Definition.—*An ulcerative lesion situated within the grasp of the external sphincter which is characterized by intense pain during and following the act of defecation (Fig. 60).* As a rule the lesion is single and situated at or in the immediate vicinity of the posterior commissure. The next most frequent site is the anterior commissure. Occurring in syphilitic subjects, multiple lesions involving any part of the anal circumference may be observed. More cases are seen and treated in men than in women, owing, doubtless, to the reluctance of the latter to seek advice for troubles of this character. The affection is one of adult life, though cases are occasionally met with in infants and young children. Certain other diseases seem to exert a predisposing influence, such as eczema of the anal region, catarrhal affections of the colon and rectum, intestinal fermentation, diabetes, etc. In congenital narrowness of the anus recurrent attacks are very apt to be noted.

ETIOLOGY AND PATHOLOGY.

The most frequent cause of fissure is traumatism. When a costive stool is to be evacuated great voluntary effort is required for its extrusion; and, if the fecal mass is of disproportionate size the overdistention

naturally results in a laceration of the anal margin. The injury most often occurs at the point of least resistance, *i.e.*, the posterior commissure, and extends to, sometimes into, the fibers of the external sphincter. Usually it is accompanied by a sensation of something giving way, with a sharp, burning pain and perhaps a few drops of blood following the action. Exposure of one or more of the sensory nerve filaments in which

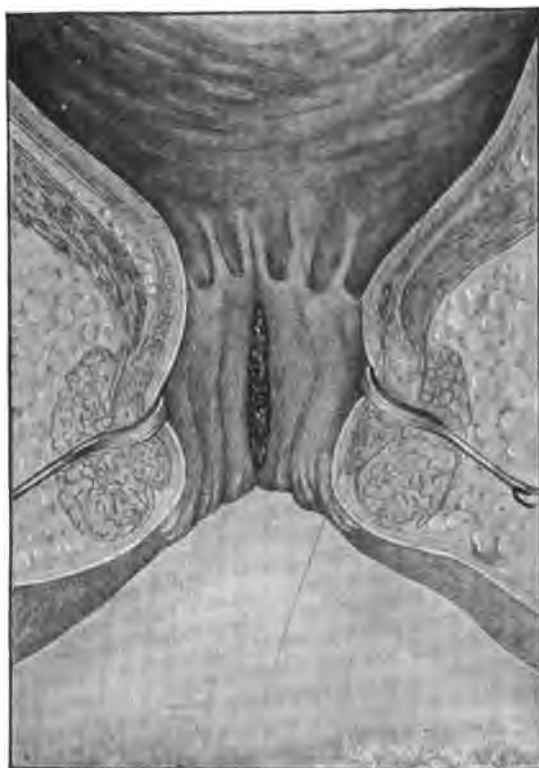


Fig. 60.—Typical anal fissure. (Tuttle.)

this region abounds almost inevitably results, so that, by reflex action, sphincter spasm is excited and a new and very active obstacle to defecation develops. In a lesion in this locality the chances are all in favor of infection, if not primarily, as a result of subsequent bowel movements, and in consequence ulceration soon supervenes. An elongated ulcer is thus produced the sides of which are kept in contact by a contracted sphincter and the healing of which is prevented both by the physiologic function of the organ and the pathologic activity of the muscle involved.

It is not necessary, however, to presuppose constipation or a costive stool, though these are far the most frequent factors concerned in the initial traumatism. The passage of a stool, normal in size, but containing a rough, nodular portion, or a projecting foreign body, is almost certain to result in laceration at some point of the contracted outlet. When the gastronomic carelessness of the average individual is called to mind, the possibility of this accident is evident. Again, the anal mucocutaneous tissues are remarkably thin and tender, and even a slight injury following the use of harsh or irritating detergents may prove the starting point of the trouble.

Occasionally an unhealed wound resulting from an operation upon the parts will develop into a typical fissure. So also with respect to the ulcerative lesions sometimes observed in chronic eczema and the several forms of venereal infection of the anal region.

In cases of pruritus ani of long standing fissure-like lesions are often seen between the radiating folds, but, happily, they are seldom characterized by the intense pain which distinguishes true fissure.

Among other possible causes which have been assigned for painful ulcer may be mentioned the forcible extrusion of large polypi, prolapsus, the practice of sodomy or rectal masturbation, injury inflicted by the syringe-tip in the administration of enemas, parturition, rough or careless use of the speculum, and fixation of the coccyx in a faulty position. As will be readily recognized, all of these various causes operate through the medium of traumatism. Hemorrhoids are almost universally assigned a prominent place in the etiology of the disease. That they are frequently associated with it is true; but the explanation of this consists in the fact that the same causes which produce the former, *e.g.*, constipation, may also produce the latter, rather than in any direct causative relationship.

Ball's ingenious theory of the causation of fissure is best given in his own words:¹ "During the passage of a motion one of these little [anal] valves is caught by some projection in the fecal mass and its lateral attachments torn; at each subsequent motion the little sore thus made is reopened and possibly extended, the repeated interference with the attempts at healing ends in the production of an ulcer, and the torn down valve becomes swollen and edematous, constituting the so-called pile, or, as it sometimes has been called, the 'sentinel pile' of the fissure. Most of us have experienced the little bits of skin torn down at the sides of the finger nails, popularly called 'torments,' and how painful they are when dragged upon. Now the torn down

¹ The Rectum and Anus, 2d edition, p. 137.

anal valve resembles closely this condition of the finger, except that in the former it is situated at the acutely sensitive anal margin, and subjected to the periodic strain of a passing motion; it is therefore not to be wondered at that the pain should be so excessive as seriously to affect the general health and render life miserable."

The chief objection to this theory is that it only fits the exceptional case. Very probably some such mode of production may occa-

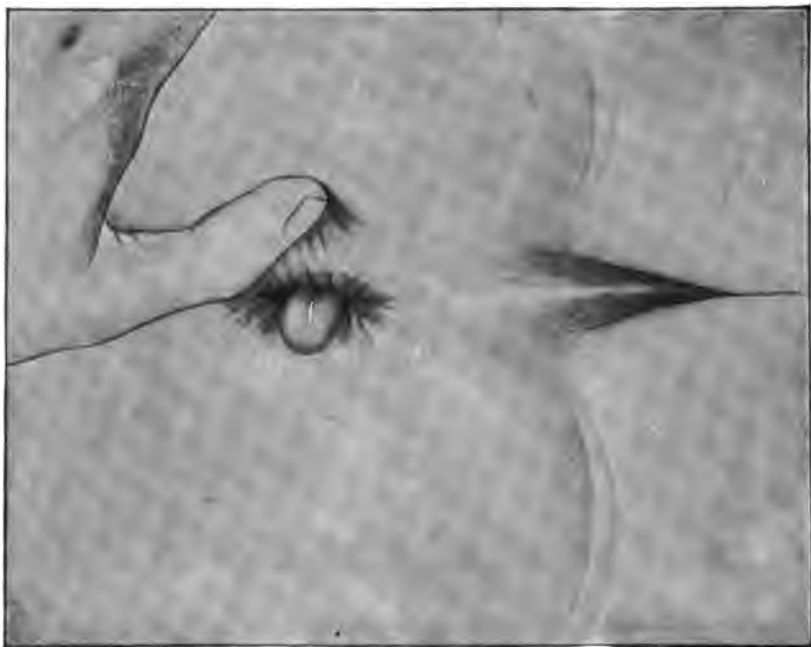


Fig. 61.—Anal fissure with sentinel pile.

sionally obtain; but I have not been able to demonstrate it in the careful examination of many cases. The truth is that the "sentinel pile" (Fig. 61) is by no means always present and the lesion seldom involves the whole length of the anal canal, as would be the case if it began at the proximal end. The traumatic origin as above described necessitates no play of the imagination and is a much more satisfactory and plausible explanation of the etiology of the affection.

The **pathology** of fissure differs from that of similar ulcerative processes in other situations only in such features as are attributable to the location of the lesion. Certain of these require more than passing mention, since explanation of the distinctive symptoms as

well as success in treatment depend upon a clear understanding of them.

The mucocutaneous tissues of the anus are supplied with sensory nerve fibers to a remarkable degree. When an injury, however superficial, occurs in this region, exposure of nerve endings is more than likely to result. Irritation follows, which expresses itself both in pain and, in conformity to the recognized law, in contraction of the contiguous muscle, *i.e.*, the external sphincter. An irritable or spasmodic condition of the sphincter (sphincter spasm) is thus established, and

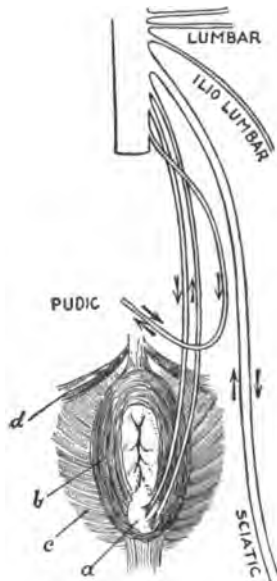


Fig. 62.—Referred pain, reflex arc (schematic). *a*, irritable ulcer; *b*, external sphincter; *c*, levator ani; *d*, transversus perinei. (After Hilton.)

soon the muscle undergoes hypertrophy, often to such an extent as to offer a formidable barrier to defecation. This condition of the sphincter muscle is regarded by some writers as the disease itself, the fissure being considered merely an accidental or incidental complication. This view is not supported by sound reasoning, since a spasmodic and hypertrophied sphincter is seldom seen in the absence of a painful local lesion and fissure, while its characteristic pain is often seen before any involvement of the muscle occurs.

Another phenomenon which is to be explained by the profuse nerve supply of the part is the tendency manifested by the anal lesion to express itself in other localities in the form of reflex pain. This

tendency is easily accounted for when the origin and relations of the anal nerves are called to mind. These nerves are derived from the same portion of the spinal cord as those which supply the other pelvic viscera and the lower extremities. Hence involvement of sensory filaments in an anal ulcer may declare itself in pain referred to the bladder, testicle, ovary, back, hip, knee, etc. This phase of the pathology of fissure is of considerable practical importance and should not be lost sight of (Fig. 62).

SYMPTOMS.

Pain is the conspicuous symptom of anal fissure. The location of the lesion, its extent and depth, and the length of time it has been in existence are the chief modifying factors with respect to the severity and other characteristics of this symptom. Ordinarily the patient is able to fix quite definitely the beginning of the trouble, recalling the passage of a certain costive stool which was accompanied by a sharp, stinging pain, perhaps also by a sensation of tearing at the anal margin, and followed by the appearance of blood-stains upon the detergent material. Occasionally such an injury may heal without further symptoms, but as a rule each subsequent act of defecation serves to increase and intensify them, and the length of the delay in seeking relief is determined only by the fortitude of the individual.

In recent cases the pain is acute and lancinating, occurs at the time of the stool, and comparatively soon subsides. In old cases in which hypertrophy of the sphincter has occurred the pain usually follows the stool and is of a dull, aching, agonizing character which may continue for several hours, leaving the patient in a state of utter prostration when it finally passes away. It is not unusual to see a strong man completely incapacitated for the day's duties by the suffering which results from an early morning evacuation. Physicians, whose lack of ability or willingness to endure pain is proverbial, have been known under these circumstances to fortify themselves with a bottle of chloroform before repairing to the toilet.

Bleeding is not a prominent symptom of fissure. The feces may be streaked with blood and the cleansing material be blood-stained, but the quantity is usually so small that its loss is of no significance.

After the ulcerative process has become established the skin about the terminal extremity of the lesion is apt to be kept moist by the seropurulent exudation, thus accounting for the pruritus, dermatitis, etc., so often observed in these cases. Doubtless also the chronic irritation due to this cause is a factor in the production of the so-called "sentinel pile," hypertrophy of the skin at the distal end of the fissure

gradually assuming the form of a sensitive protuberance of variable size.

The constitutional symptoms, particularly in long-standing cases, may be out of all proportion to the extent and gravity of the lesion, sometimes even simulating those of malignancy. The constipation kept up by dread of pain, with its attendant train of evils, lack of rest and resulting nervousness, and the pernicious effects of morphine and other opiates, which alone have power to assuage the suffering, in the course of time induce symptoms often closely resembling those of grave systemic disease. The strongest constitution may thus sooner or later be undermined by the ravages of this apparently trivial malady.

Attention has already been directed to the possibility and *modus operandi* of reflex symptoms. Sphincter spasm is itself a reflex phenomenon and serves to maintain incessant irritation of the local lesion. It is not unusual to find the pain manifesting itself in tender prostate, spasmodic stricture of the urethra, irritable bladder, involuntary seminal emissions, so-called coccygodynia, and, in women, ovarian neuralgia, vaginismus, etc., and, more rarely, in the more remote parts innervated by the sacral plexus. Anal fissure as the cause of such pains may not even be suspected unless the possibility of reflex nerve action is constantly borne in mind, and the fact recognized that a reflex pain means a lesion somewhere.

DIAGNOSIS.

Fissure is the one form of rectal disease in which a correct diagnosis may be made with reasonable certainty from the symptoms alone. Indeed, the single symptom of pain,—its character, intensity, duration, and time of occurrence with reference to the act of defecation,—to those who know how to interpret it, will often point unerringly to the existence of a fissure. But it will tell nothing as to the exact location of the lesion, its cause or possible complications, the condition of the sphincter muscle, etc. These can only be learned by physical examination, which should be the rule in every case. A systematic examination of the adjacent organs, as well as of the entire rectum, should also invariably be made, so that neither effects nor possible associate pathology may be overlooked. In a given case treatment of the fissure without recognizing the existence of a polypus or a retroverted uterus causing constipation, for instance, would manifestly not only be poor surgery, but would offer little in the way of permanent relief.

Detection of the lesion is not always easy, on account of its small size and hidden location. When a "sentinel pile" is present the diagnosis may be made with little effort, but it should again be stated that in

many cases no such guide is to be found. A careful, painstaking search, however, after due consideration of the symptoms, will seldom go unrewarded. In a large proportion of cases the lesion will be found in the posterior third of the anus, at or close to the coccygeal raphé, but may be found in any portion of the anal circumference.

Multiple lesions are rarely encountered except in syphilitics. For this reason they are always significant and should be regarded with suspicion.

It is always important to determine the extent of the lesion and the degree of involvement of the sphincter. For the former purpose it may be necessary to use a probe; for the latter no instrument serves so well as the finger. Extreme care and gentleness are necessary to a successful examination. In exceptional cases it may be advisable to administer an anesthetic, first gaining the patient's consent to meet the indications growing out of the examination.

PROGNOSIS.

Aside from the possible effects of the pain itself, fissure is in no sense to be regarded as a serious affection. While readily amenable to treatment, after the lesion assumes the true ulcerative type it is essentially chronic, showing little or no tendency to spontaneous healing.

In addition to constipation and its sequels, pruritus, the constantly increasing hypertrophy of the sphincter, and impairment of the general nervous system consequent upon the pain, infection resulting in perirectal abscess is the only complication of special note. Strangely enough, when the nature of the trouble is considered, this is of rather infrequent occurrence; but the possibility should not be lost sight of.

TREATMENT.

The treatment of fissure may be non-operative or operative. Comparing the two methods in a general way, it may be said that the only advantage possessed by the former is that, if successful, it eliminates the question of surgery, the mere suggestion of which carries terror to so many patients. On the other hand, some of its disadvantages are that it is uncertain, requires a much longer time, is painful, does not permit the proper attention to causative or resultant pathology, and, most important, ignores the condition of the sphincter muscle.

Non-operative Treatment.—The class of cases in which the non-operative method of treatment is most likely to prove successful is that in which the lesion is of recent occurrence and without complications. Unfortunately cases conforming to these specifications are rarely en-

countered for the reasons that the pain is not usually excessive and the endurance of the patients has not yet been taxed to the limit.

The first indication of the non-operative treatment is to maintain a soluble condition of the stools. This may be met by regular moderate daily doses of some gently acting laxative. The old mixture of sulphur and cream of tartar, or the modern remedy, phenolphthalein, will serve this purpose well. When for any reason it is suspected that the stool has become costive, its passage should be anticipated by an enema of tepid water followed by an ounce of olive oil.

Many local applications have been recommended to promote the healing of the lesion. The choice of these will be determined by the conditions to be met. In recent cases cleanliness, a mild antiseptic wash, and the application of a dusting powder, *e.g.*, aristol, calomel, from day to day may be all that is required. When the lesion is particularly sensitive, orthoform, alone or in combination, is one of the most useful dusting powders because of its marked sedative properties.

When the local treatment of long-standing cases is undertaken, a different class of applications will be called for. Lesions of this type as a rule present a glazed, unhealthy appearance and the contiguous tissues are more or less indurated. Here stimulating, and occasionally even caustic, applications will be required. Ichthyol (pure), carbolic acid (pure), balsam of Peru (10 to 20 per cent. in castor oil), argyrol (10 to 20 per cent. solution), and nitrate of silver (5 to 20 per cent. solution or stronger) are the most useful agents of this class. The parts should always be carefully cleansed with an antiseptic solution before the remedy is applied. When the stronger solutions of nitrate of silver are to be employed it is both wise and humane to precede them with the application of a 10 per cent. solution of cocaine kept in contact with the lesion for at least five minutes by means of a pledget of cotton.

An observation in this connection growing out of personal experience is that in cases complicated by the presence of a so-called "sentinel pile," no kind of local application is likely to prove effective until this obstacle is removed. This is easily and painlessly accomplished by injecting a few drops of a 1 per cent. solution of cocaine beneath the pile and snipping it off at its base with a pair of curved scissors.

This method of treatment requires patience on the part both of the patient and the physician. I do not hesitate to recommend it, however, in suitable cases, and have had some very happy results following its use.

Operative Treatment.—Two operative methods of treatment are available, each curative with practically equal certainty, and each possessing points of advantage. One method is divulsion of the sphincter

under general anesthesia; the other, incision of the sphincter, which may be readily accomplished under local anesthesia. The first possesses the decided advantage of rendering thorough work possible; the second has the, to many, no less decided advantage of eliminating the dangers of chloroform and ether. Viewing the question in the abstract, it must be conceded that in the average case the former consideration is the more weighty, for the reason that fissure is so often associated with other forms of local pathology.

The term *divulsion* as here employed means something less than its literal translation would suggest, though "tearing asunder" well describes the practical interpretation sometimes put upon it. The one considerable danger to be avoided in this method is its too vigorous application. Rupture of the sphincter with permanent incontinence has been known to follow in more instances than one. The importance of this point is so great as to render a brief description of the proper technique desirable, especially in view of the fact that *divulsion* forms the preliminary step of a large percentage of rectal operations.

With the patient in the lithotomy position under full surgical anesthesia, one finger of each hand is introduced well into the rectum and the anus gently, but forcibly opened. Two fingers of each hand are then introduced and the sphincters thoroughly stretched in every direction until the tonicity of the muscle is completely overcome. That the *divulsion* has reached the proper degree may be recognized by the anus remaining patulous and the rectal mucosa showing a tendency to prolapse on withdrawal of the fingers. The manipulation should not be hastily executed. The old method of introducing the thumbs, grasping the tuberosity of the ischium on either side, and suddenly and violently separating them is barbarous and has not infrequently resulted in incontinence from injury to the muscle. Especial precautions should be taken in the case of females because of the relatively greater capacity of the pelvic outlet and the anatomic relations of the sphincter. Many varieties of speculums have been devised and extolled for the purpose, but for obvious reasons the fingers are much to be preferred.

When the *divulsion* is effected the lesion itself should receive attention. Usually the application of the sharp curette and trimming off any overlapping edges will be all that is necessary, though, when the induration is marked, it is my custom to incise the base of the lesion. Of course, the "sentinel pile," if present, should be snipped away, and other hemorrhoids, polypi, etc., be removed.

Some ecchymosis of the perianal tissues usually follows the manipulation and a certain amount of local soreness persists for several days. Healing may be hastened by the daily application of a 10 or 15 per

cent. solution of argyrol. Cleanliness and the application of an anti-septic lubricant are the only other indications of after-treatment. Ordinarily the contractile power of the sphincter is fully regained within forty-eight hours and by the end of another day the patient is usually able to go about his regular duties.

The method by incision may very readily be practised at the office,



Fig. 63.—Method of incision, right angle to sphincter.

though it is not always advisable to do so. The technique consists in injecting beneath the base of the lesion sufficient of the anesthetic solution ($\frac{1}{2}$ to 1 per cent. cocaine or novocaine) to thoroughly infiltrate a considerable area of the adjacent tissues. The fissure is then curetted and any overlapping edges or sentinel pile trimmed away, after which the external sphincter is completely divided with the knife or scissors *at a right angle to the direction of its fibers*. A small strip of gauze saturated with sterile oil or vaselin is packed into the incision, and a compress and T-bandage complete the dressing.

The proper placing of the incision is determined by the location of the lesion. Ordinarily it extends through the base of the lesion. But the object aimed at is to set the parts at rest by severing the muscles, and to accomplish this it may be necessary to place the incision entirely apart from the fissure, as, for instance, when the latter is directly in the posterior commissure (Fig. 63). Of course, every antiseptic precaution should be observed at the operation and in the after-treatment. Usually healing will be complete in a week or ten days.

Either of these two methods of treatment will be found entirely satisfactory in the average case,—at least so far as concerns cure of the fissure. Indeed, no surgical procedures are attended with more uniformly certain and happy results.

OTHER FORMS OF ANAL ULCERATION.

Fissure is the only form of ulceration which may be said to be peculiar to this region, the peculiarity being due rather to location than to anything unusual in the disease process itself. The anal and perianal regions are subject to the same types of pathology as are met with in other portions of the cutaneous envelope, many of which are ulcerative in character. In addition to those due to the ordinary skin infections the most familiar varieties of ulceration are the venereal, epitheliomatous and tuberculous. There is nothing distinctive about any of these further than is readily accounted for by the special site. As might be expected, pain is much more pronounced than in similar lesions in other localities, on account of the profuse sensory nerve supply and the special function of the part; but otherwise, the symptoms and physical characteristics are in the main identical.

In the older writings on diseases of the rectum and anus frequent allusion is found to certain peculiar types of ulceration, such as "esthiomene," rodent ulcer, etc., which the more exact modern methods of clinical investigation have robbed of their claims to distinction. By common consent such cases are now classified under syphilis, phagedenic chancroid, epithelioma, or localized tuberculosis, and the subject in consequence has been greatly simplified.

The treatment of this comprehensive group of anal ulcerations I shall not discuss in detail. The general principles already laid down apply as well here as to corresponding pathology in the rectum proper, with the additional advantages that the lesions are more readily accessible and the great desideratum of cleanliness is far more easily secured and maintained.

When an ulceration of any type extends into the anal canal it is apt to assume the forms and characteristics of fissure. In such event, in addition to the regular treatment, the special indications growing out of the presence and involvement of the sphincter muscles will have to be met. These have heretofore been sufficiently discussed.

CHAPTER X.

Perirectal Abscess.

LOCALIZED inflammation of the perirectal tissues is practically always the result of infection, and usually terminates in suppuration. The pathogenic organisms encountered in this locality are of the usual pus-forming types, with the rather constant addition of the colon bacillus and, more rarely, the bacillus tuberculosis. As a general thing the rectum is the source of supply of the *matrices morbi*, which find ready escape through a wound, abrasion, or other lesion of the bowel wall, though it is, of course, possible for the infection to originate elsewhere and to enter the tissues in other ways.

Much of the interest and more of the importance of perirectal abscess consists in the fact that it so often results in the formation of fistula. When we recall the relatively high proportion of fistula cases met with clinically, and reflect that their occurrence in the vast majority of instances is due to neglect or mismanagement of the primary lesion, neither the interest nor the importance of the subject requires further emphasis. It is probably not an exaggeration to say that in one or the other form, abscess or fistula, the disease is represented in not less than 33 $\frac{1}{3}$ per cent. of all rectal cases.

The most natural classification of the abscesses met with in this region is according to their location above or below the levator ani muscle. The former (supralevator) are of comparatively infrequent occurrence, but constitute a far more serious condition than when the trouble is located on the distal side of the muscle. The latter class (infralevator) may be subdivided into three varieties, *i.e.*, marginal or anal, intramural and ischiorectal. This class comprises the more ordinary and familiar types of the disease, and will be first considered.

MARGINAL ABSCESS.

Marginal abscess may occur at any point of the anal circumference. As indicated by its name it is superficial in location, lying between the integument and the external sphincter muscle. In number it is usually single, in size small, in gravity insignificant. When fistula results in these cases it is of the variety known by the corresponding name of marginal fistula (Fig. 64).

Etiology.—Traumatism is undoubtedly the most frequent exciting cause of marginal abscess. Overdistention of the anus by costive stools furnishes a ready means for the infliction of injuries through which infection may reach the tissues. Thrombotic hemorrhoids, produced in the same way, may result in inflammation and suppuration. The use of rough detergents or any kind of traumatism from without may be followed by a similar effect. In fact, when we remember the extreme delicacy of the perianal integument and the frequency with



Fig. 64.—Marginal abscess.

which it is necessarily subjected to irritation and injury, the wonder is that the trouble is not more often encountered.

Occasionally the trouble assumes the form of one or more ordinary furuncles somewhat removed from the anal margin. In these cases it is probable that the infectious agent obtains access through the hair follicles.

Symptoms.—Pain is the most salient symptom of marginal abscess. In spite of the comparatively small size of the lesion the pain is usually quite severe and, on account of the location, is always greatly increased by the act of defecation. As in the case of the thrombotic pile, the constant sensation is that of a foreign body in the anus which the resentful sphincter seeks to expel by more or less continuous spasmodic contractions. Tenderness is extreme, the

lightest touch of the clothing causing extraordinary suffering. As a rule there is no constitutional disturbance.

The trouble is readily diagnosed upon simple inspection. The acutely sensitive swelling and the presence of the ordinary evidences of a circumscribed collection of pus preclude the possibility of any mistake.

Treatment.—The treatment of marginal abscess is wholly surgical. As temporary expedients an anodyne ointment and a hot poultice to relieve pain and diminish tension may be permissible. But the undesirable sequela of a marginal fistula can be certainly avoided only by early and free incision. This is most satisfactorily accomplished by freezing the part with the chloride of ethyl spray. The injection of anesthetic agents is not to be recommended in these cases for the reasons that the overlying tissues are usually too thin to retain the solution and the pain of introducing the needle is as great as that of the incision would be without anesthetization.

The pus should be gently expressed and the cavity thoroughly cleansed with a mild antiseptic solution. It is usually advisable to insert a small piece of well-oiled gauze between the edges of the incision at the first dressing. Healing is generally prompt and rapid and the after-treatment differs in no way from that of a superficial abscess located elsewhere.

INTRAMURAL ABSCESS.

Strictly speaking, this is the only variety to which the term "rectal abscess," sometimes employed to comprehend all forms of the disease, is applicable. As the name implies, it is confined to the bowel wall itself, lying between the mucous and muscular coats. It is of comparatively infrequent occurrence and, owing to the fact that it is situated above the anus where the sensory nerve supply is less profuse, is easily overlooked (Fig. 65).

A wound or other lesion of the mucosa giving rise to infection of the submucous connective tissue is the usual source of the trouble. Among the specific causes careless introduction of the syringe tip and traumatism from a foreign body in the feces are the most common.

The symptoms are always more or less obscure and the diagnosis is often not made until a discharge of pus from the rectum occurs. There may be a sense of dull aching and discomfort in the parts and in some cases moderate constitutional disturbance. The trouble is usually located within reach of the finger, and careful digital examination may detect an indefinite circumscribed swelling which is tender

on pressure. Inspection through the proctoscope may also furnish valuable information to the trained observer.

This is the only form of abscess met with in this region in which incision from within the rectum should be considered. Here it offers the readiest and at the same time a reasonably safe means of approach. The incision should extend the full length of the abscess cavity and be made parallel with the long axis of the gut so as to avoid the larger blood-vessels. Especial care should be taken to open freely



Fig. 65.—Intramural abscess. (*Tuttle.*)

the lower end of the abscess in order to insure free drainage, and to confine the incision to the mucosa. Washing out the cavity with peroxide of hydrogen and packing lightly with gauze a few times will be the only after-treatment required. The work is best done through a proctoscope of suitable size and length.

ISCHIORECTAL ABSCESS.

This is the most common form of abscess occurring in this region and is far more serious than those just considered. It is an affection of adult life and is much more frequent in men than in women. The ischiorectal fossæ, from which the name is derived, are pyramid-shaped spaces lying upon each side of the terminal inch of the bowel

and filled, in the natural state, by loose connective tissue containing considerable fat in its meshes (Fig. 66).

Pus developing within these spaces tends in the direction of least resistance and if left to itself, in the majority of instances, will break first into the bowel. The site of the rupture is almost always at some point between the two sphincters, the insertion of the levator ani preventing the pus from making its way further upward. In neglected cases one or more secondary openings upon the cutaneous surface are very apt to follow because of imperfect drainage and the entrance of irritating matter from the rectum. In exceptional cases the abscess may "point" and break first upon the skin surface. Such cutaneous opening usually occurs at some point in the skin overlying the ischio-rectal fossa, but may be found anywhere in the anoperineal region.

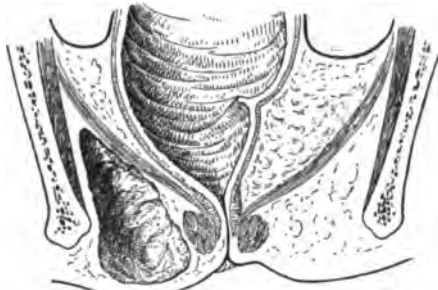


Fig. 66.—Ischio-rectal abscess.

The pus may burrow forward into the perineum or backward between the rectum and coccyx into the fossa of the opposite side. When spontaneous rupture of the abscess upon the mucous surface takes place the opening will most frequently be found at or near the median line posteriorly.

Etiology.—Infection through a breach in the mucous membrane is undoubtedly to be placed at the head of the list of causes. This may be effected in many ways: by injury from the passage of foreign bodies or their lodgment above the sphincter, overdistention of the anus by a costive stool resulting in laceration, injury by the syringe nozzle roughly introduced, the injection treatment of internal hemorrhoids, any operation upon the parts in which the after-treatment is neglected, ulceration of any kind, particularly that due to stricture situated low down, etc.

Traumatism from without, as a kick or fall, is not infrequently an exciting cause. Protracted illness and depraved states of the general health in which emaciation occurs deserve to be mentioned as predis-

posing causes because of the loss of the local protecting fat in these conditions, as well as the lowered vitality of the tissues.

In certain cases it may be quite impossible to determine the exact method of infection. Indeed the idea has been advocated that the infection may be of hematogenous origin, but this view seems far less reasonable than that the primary local lesion or traumatism from without has escaped observation or been forgotten.

Symptoms.—In quite a large proportion of cases the onset of the trouble is marked by constitutional symptoms,—a decided chill followed by high fever, furred tongue, headache, constipation, and general malaise. As a rule, however, the patient will have already noticed a feeling of discomfort or dull aching in the parts which he probably attributed to some kind of “piles.” Soon this discomfort is changed to an acute throbbing pain which constantly increases in severity. If the focus of infection lies near the surface, the evidences of active inflammation rapidly become apparent; the skin becomes red, tense, and hot, and the part swollen, indurated, and excessively tender. When the site of infection is at a deeper level, bimanual examination with a finger in the rectum may be required to detect the induration and determine the exact nature of the trouble in the early stages. In neglected cases the brawny, glistening swelling and induration sometimes involve an entire buttock and present a very characteristic appearance. Occasionally retention of urine is a complication. This is most apt to occur when the pus makes its way forward into the perineum.

It sometimes happens that the inflammatory process assumes the nature of an acute or even gangrenous cellulitis and spreads with great rapidity. These are cases of exceeding gravity as regards the life of the patient as well as the local result, profound septic intoxication and extensive destruction of tissue quickly following.

When the abscess ruptures or is opened there is immediate relief of all symptoms and in consequence the patient is apt to delude himself with the idea that his trouble is at an end. The pus in a typical case is of a most malodorous, nauseating character. This fact has been erroneously interpreted as indicating that a communication exists between the bowel and the abscess cavity, whereas the only certain indication is that the bacillus coli has been at work in the tissues.

In the so-called “cold abscess,” which is practically always of a tuberculous nature, the symptoms are all much less acute. In fact an abscess of this kind may go on to spontaneous rupture with little or no constitutional disturbance and without pain enough to seriously inconvenience the patient. The pus of a tuberculous abscess is thin,

whitish in color and often contains cheesy or flocculent particles. In suspicious cases the microscope should always be employed. In reality, it would be a wise and safe routine to have a microscopic examination of the pus in all cases. The percentage of positive findings would undoubtedly be surprisingly large, and the practical bearings of such findings would obviously be of the most serious import. Such a course would certainly safeguard our patients' interests and occasionally, perhaps, even furnish lifesaving information.

The **prognosis** of ischiorectal abscess depends wholly and absolutely upon the plan of treatment adopted. No disease yields more readily and kindly to proper management and in none may complete recovery be more confidently counted upon. If poulticed and allowed to take its own course, on the other hand, fistula is the practically inevitable result, to say nothing of the days of suffering which such a plan of mismanagement necessarily entails. And, sad to say, this is the course too often pursued even in this day of surgical enlightenment, with the result that fistula, a preventable malady, is one of the most frequent of all rectal affections.

Treatment.—It is utterly vain to hope for resolution in these cases and the time spent in the employment of palliative measures is worse than wasted. Early and free incision constitutes the only rational plan of treatment. It is neither necessary nor advisable to wait for the physical signs of pus. This is usually present long before it can be accurately located, and delay only means unnecessary destruction of tissue and a prolonged period of repair. If for any reason delay is unavoidable, an ice bag is the best local application, though a hot poultice will prove more grateful to the patient.

For the sake of thoroughness the operation is best done under general anesthesia, and, since the time required is generally very short, nitrous oxide is an eligible anesthetic in most cases. The character of the incision is a matter of special importance. The knife should be entered deeply enough to reach the pus and the incision be extended across the most prominent part of the swelling in an *anteroposterior* direction. In other words, the incision should be across the radiating anal folds, not between them, as in the latter event contraction of the parts after the escape of the pus would tend to close it and impede drainage. If the cavity is very large and deep a supplementary incision may be made at right angles to the first, extending outward upon the buttock (Fig. 67). The finger should be introduced and all loculi broken down, after which the entire cavity should be carefully curetted. The cavity should then be irrigated with a warm bichloride solution (1:2000) and packed with gauze saturated with antiseptic oil to facilitate removal. The outside

dressings should be changed as soon and as often as they become soiled, but the packing may be left in place for several days. Thereafter it should be renewed daily, care being taken merely to fill the cavity without pressure so as not to retard granulation. For the daily irrigation permanganate of potash solution (1:3000 or 1:4000) answers well, seeming both to control suppuration and promote granulation. The precaution should always be observed to regulate the flow so that the stream is gentle, as healing is undoubtedly often interfered with by repeated irrigations when the pressure is unduly great.

In the later stages of protracted cases or when for any reason healing is retarded, stimulation of the wound becomes necessary. For this purpose balsam of Peru (25 to 50 per cent. in castor or olive oil), nitrate of silver (1 to 2 per cent. solution), argyrol (15 to 25 per cent. solution), or formalin (1:500 or 1:250 solution) will be found useful. When practicable it is advisable, particularly in extensive cases, to keep the patient in the recumbent position until the reparative process is well established.

Unless the rectal wall is already perforated or hopelessly encroached upon, this plan of treatment faithfully carried out will rarely prove disappointing. Unremitting care in the after-treatment is the keynote of success.

A common difficulty which the surgeon has to contend with in these cases consists in the fact that evacuation of the pus is followed by such great and immediate relief that a false sense of security resulting in carelessness is engendered. For this reason the nature of the trouble should be fully explained to the patient and the inevitable consequences of neglect pointed out, so that the responsibility for failure to follow the advice offered may rest with the party most concerned.

When a case is seen sufficiently early there is no reason or excuse for a fistula to result. Yet, strange to relate, the idea is still more or less widely prevalent among physicians as well as the laity that abscess and fistula are one and the same disease; and the advice is not infrequently given patients to apply a poultice and wait till the acute symptoms subside, then have the fistula "cut out." Of course such advice is founded upon a ridiculous misconception, but the harm and injustice resulting are not more venial on that account.

The Treatment of Tuberculous Abscess.—When the tubercle bacillus has been demonstrated to be the active cause of the trouble it is important to determine whether this is the only site of infection. If so, the abscess should be attacked radically with the hope of limiting the infection to the part involved. To this end, after free evacuation of the pus, the cavity may be swabbed out with tincture of iodine or pure

carbolic acid followed by alcohol, after which it should be treated in the ordinary way. It is important to remember that the use of the curette is dangerous in this class of cases on account of the possibility of opening up fresh avenues for the extension of the infection.



Fig. 67.—T-incision in draining.

If, on the other hand, the perirectal focus occurs in a patient already the victim of pulmonary tuberculosis, the indications will best be met by opening the abscess under local anesthesia, since the dangers of chloroform or ether would outweigh the possible benefits of more radical surgery. Thereafter the healing of the local condition should be promoted in every way possible, stimulating applications being generally demanded from the beginning. But the general treatment is of far

greater moment in these cases. The abscess is to be regarded as of minor importance and especial care taken to adopt no measure or method of treatment which would have a tendency to confine the patient to bed.

The possibility of the occurrence of an acute, inflammatory, non-tuberculous abscess in a consumptive patient should not be lost sight of. Here, unless the constitutional disease is too far advanced, the healing of the local affection may be reasonably expected, and every effort should be made to encourage it.

The general principles which underlie the modern conception and management of tuberculosis are, or should be, familiar to every physician, and their intelligent application is as important in this as in any other class of cases.

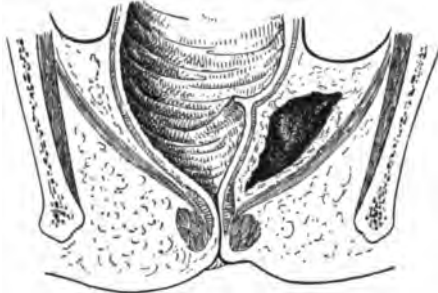


Fig. 68.—Pelvirectal abscess.

RETRORECTAL AND PELVIRECTAL (SUPRALEVATOR) ABSCESS.

Perirectal abscess located above the levator ani muscle constitutes a much more serious and difficult condition than those above discussed. It is also, happily, a much rarer condition. The space between the peritoneum and the upper surface of the levator ani muscles is divided, rather arbitrarily it is true, into three compartments, a retrorectal and two superior pelvirectal. The former, as its name indicates, is situated behind the rectum, between it and the anterior surface of the sacrum and coccyx; the latter anterolaterally with reference to the rectum, separating it from the deep urinary and other pelvic organs. These spaces are filled in the natural state with loose cellular tissue in which the blood-vessels and lymphatics ramify, and anatomically communicate with each other and with similar tissue in the pelvis and lower abdomen. Clinically the boundaries between these spaces seem quite definitely marked, since an abscess originating in the retrorectal division shows little tendency to extend into the lateral divisions, and *vice versa* (Fig. 68).

The downward escape of pus from any of these spaces is strongly obstructed by the levator muscle with its tough aponeurotic covering, though in rare instances it has been known to find its way into the ischiorectal fossa and present as a surface swelling. It is much more apt to perforate the rectum or bladder, or make its appearance in the lower abdomen or at some point upon the hip or thigh after escaping through one of the openings from the pelvis.

Etiology.—Most of the causes enumerated for ischiorectal abscess may also cause abscess above the levator ani muscle. In addition a number of other etiologic factors may be operative in the latter region. Internal proctotomy and other operations upon the movable rectum in which the important matter of drainage is neglected or inadequately provided for, disease of a vertebra or of any of the bones of the pelvis, a broken-down lymphatic gland of the sacral, lumbar, or iliac group, acute inflammation of the deep urethra, prostate, or seminal vesicles and septic infection following operation upon these organs, and in the female the traumatism of childbirth, suppurative disease of the adnexa, and any condition giving rise to infection of the pelvic cellular tissue are all recognized as possible exciting causes of this affection.

The possibility of the tubercle bacillus as the cause of this as also of all other forms of perirectal suppuration must be constantly borne in mind.

A memorable case (see report below), recently under my care, was clearly traceable to the carbolic acid injection of internal hemorrhoids and ultimately resulted in the loss of a valuable life.

Symptoms.—The symptoms of this type of abscess are often very obscure. This is particularly true in the early stages. Evidences of septic absorption may or may not be pronounced. The patient may be obviously quite ill and yet the attention not be definitely directed to the part involved. In fact not a few cases have been treated for typhoid or other kinds of fever until a copious discharge of pus from bladder or rectum indicated their true nature.

In the average case, in addition to such general symptoms as chill or rigors followed by febrile reaction, furred tongue, malaise, etc., there will be at first complaint of vague aching and weight in the pelvis or sacral region, with possibly some disturbance of the urinary function and increasing constipation. Examination at this stage is not often resorted to and, if made, will very probably reveal no tenderness, swelling or other sign of local trouble. It is usually not until the tension of the increasing pus collection results in acute pain or marked interference with the urinary function that the subjective symptoms become of diagnostic value.

In reaching a **diagnosis** the history of the case with special reference to former disease or operation upon the pelvic organs is often of great assistance. As soon as suspicion is directed to the probable seat of the trouble careful physical examination should be instituted. In the female this will often at once settle the diagnosis. But in the male patient, the rectum alone being available for the examination, the true nature of the case frequently remains in doubt for a much longer period,

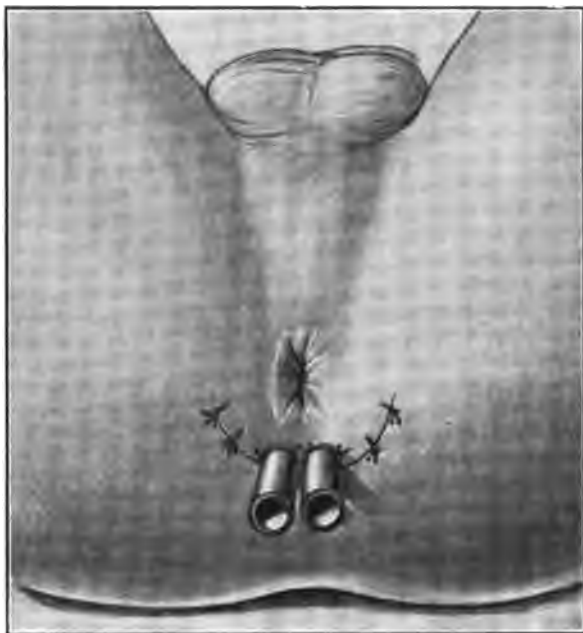


Fig. 69.—Double tube sutured in wound.

—until the pus burrows downward to where it can be felt or seen as a swelling of the bowel wall.

Of course the aid of the leucocyte count should always be sought in this as in other obscure conditions in which suppuration is suspected.

The **prognosis** is always and necessarily extremely grave. A large proportion of the recorded cases have terminated fatally by rupture of the abscess into the peritoneal cavity. Should this not occur, the danger of a rupture into the bladder or rectum with its resultant persistent fistulous tract and prolonged suppuration, is very great. A favorable prognosis in these cases depends upon early recognition of the true condition and prompt evacuation of the pus. If left to nature, even when

the life of the patient is not sacrificed, permanent injury and invalidism are very apt to result.

Treatment.—The one indication of treatment in this as in all other forms of perirectal abscess may be expressed in three words, *i.e.*, incision and drainage. Except in the female, where in certain cases the vagina affords a favorable route, the incision should always be through the perineum. The advice offered by some authorities to drain through the rectum is to be emphatically condemned in view of the certainty of a permanent fistula resulting. I hold with Tuttle that when the pus can be definitely located by rectal examination it can be reached by perineal dissection, and this should invariably be the avenue of approach.

If the abscess is located in the retrorectal space, it is best reached by a crescentic incision between the anus and coccyx. If in an antero-lateral space a similar incision between the anus and scrotum followed by careful dissection until the pus is reached should be the operative procedure. It is in the latter class of cases in the female that the vaginal route is available.

The important question of drainage is best met by suturing two full-sized rubber tubes in the wound, one to supply entrance for the irrigating fluid, the other the exit (Fig. 69). No attempt should be made to pack the abscess cavity with gauze after the first dressing when the control of hemorrhage may require it. Daily irrigations with some antiseptic solution and general tonic and supportive treatment will fulfill the subsequent indications in the average case. The final healing of the cavity and drainage tract may mean a matter of months, and patience and persevering care will be necessary to secure this fortunate result.

CASE.—D. A. W., white, aged 52, merchant, submitted to the injection treatment of his internal hemorrhoids in January, 1910, previous to which time his health had been perfect with the exception noted. Pain following the treatment was persistent and excessive. On the seventh day he passed a large quantity of blood, estimated as a "basinful," after which the local pain gradually subsided. But the patient did not get well. During the following two months he was confined to the house the greater part of the time with symptoms resembling an attack of fever,—in fact, both malarial and typhoid fever were suspected by the attending physicians. By the end of the second month the discomfort in the sacral and pelvic regions, previously attributed to the elevated temperature, had developed into a constant dull aching, and irregular chills and sweats became more frequent. The probably septic nature of the trouble was now recognized, but no focus of suppuration could be located.

I first saw the patient in March, some ten weeks after the hemorrhoid operation. In the light of the history of the case the diagnosis of a pelvic abscess seemed clear, but its location could not be definitely determined by rectal examination. The abdomen was exceedingly tender, particularly low down in the left iliac region, where an obscure sense of fullness and resistance could apparently be made out.

Feeling that the seat of the trouble could best be reached through the abdomen, I brought the patient to Nashville and, after a few days of preparatory treatment and further study of the case, operated. Under general anesthesia a distinct swelling could be made out in the left side of the pelvis and the attempt was made to reach it by extraperitoneal dissection through an incision parallel with Poupart's ligament. On reaching the proper depth I was surprised to find that the swelling had disappeared. Investigation revealed that the abscess had ruptured into the bowel and a large quantity of pus was evacuated. No harm resulted from the abdominal incision and after a few weeks the patient was allowed to return home, being instructed to report at regular intervals. After repeated efforts the point of rupture was located about two and one-half inches above the anus in the midposterior line, into which a probe could be introduced fully six inches.

As was feared, the drainage ceased, the abscess cavity again filled and the symptoms returned, and five weeks after the first operation the patient was again anesthetized and a crescentic incision made between the anus and coccyx. When the dissection was carried through the levator ani an enormous quantity of pus was discharged,—not less, certainly, than three pints. Under daily irrigations rapid improvement followed and complete recovery seemed assured. But a condition of melancholia developed during convalescence and, in spite of every precaution, the patient committed suicide in August, seven months after the injection of his hemorrhoids.

CHAPTER XI.

Anorectal Fistula.

THE word *fistula* literally means a pipe or tube, particularly the kind found in musical wind-instruments. Its application in pathology doubtless originated with the disease which forms the subject of the present chapter, as here the most frequent and perfect type of the malady is met with.

Historically, the subject of fistula is most interesting. As is true of so many other diseases, it was quite accurately described by Hippocrates, and few later writers among the ancient immortals failed to make mention of it. Henry V of England and Louis XIV of France, we are told by the historians, were victims of fistula, the former dying of the malady and the latter living to reward the surgeon who operated upon him successfully with the magnificent fee of \$72,500.

DEFINITION.

Anorectal fistula may be defined as *a condition resulting from suppuration, of which the presence of one or more chronic sinuses is the characteristic feature.* In the typical condition the sinus opens both into the rectum or anal canal, and upon the skin surface. The several varieties will be described in the context.

The frequency of fistula as compared with other rectal diseases is variously estimated. The statistics of the celebrated St. Mark's Hospital, London, show that fully fifty per cent. of all patients admitted suffer from this affection. But St. Mark's enjoys a time-honored reputation for the successful treatment of fistula and as a natural consequence this class of cases is drawn to it. In surgical clinics devoted to rectal diseases fistula probably comprises one-third of the cases requiring operation. In private practice the proportion is much smaller, and I am impressed, is constantly diminishing, due to the more widespread knowledge of the present day as to the proper treatment of abscesses in this region.

The extremes of age are comparatively exempt from the disease, though it is occasionally observed both in infants and in the aged. It is much more common among the poorer classes than among the well-to-do, owing, doubtless, to the facts that the mode of life of the former involves greater privation and exposure, and correct habits of personal hygiene are less carefully observed.

Fistula is encountered much more frequently in men than in women. Statistics upon this point differ so widely that they are of little value. In the writer's experience the disproportion has been most marked, out of several hundred cases operated upon not more than a dozen or so occurring in women. This, however, is probably considerably below the

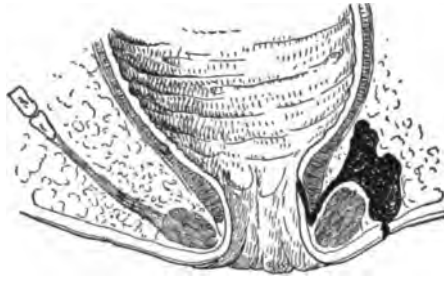


Fig. 70.—Complete fistula.

real proportion. The more active life of the male with the consequent exposure to traumatism and infection, and indiscretions in diet, are apparently the only explanations of the relative frequency of the disease in that sex.

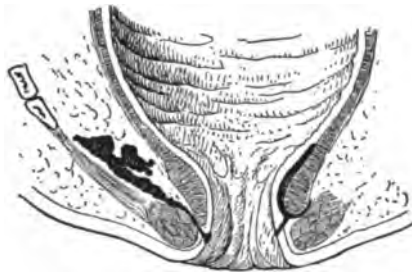


Fig. 71.—Incomplete fistula (blind internal).

ETIOLOGY.

Varieties of Fistula.—There are several methods of classifying fistula: (1) By the site of the opening, as *complete* or *incomplete*. In the former the sinus connects two openings, one in the rectum or anal canal, the other on the skin surface (Fig. 70). In the latter there is only one opening, which may be in the bowel (*blind, or incomplete, internal fistula*) (Fig. 71) or on the cutaneous surface (*blind, or incomplete, external fistula*) (Fig. 72). (2) By the kind of tissue involved, as *submucous* (Fig. 73), *mucocutaneous*, or *subcutaneous* (Fig. 74). (3) By

the character of the fistula itself, as *simple* or *complex*. A familiar example of the latter is known as *horseshoe fistula* (Fig. 75), in which the sinus pursues a circuitous course in the tissues, partially or even, occasionally, completely surrounding the bowel.

It is at once evident that every fistula must belong to all of these classes. Thus, in a given case a fistula may be *complete*, *submucous* and *simple*, or it may be *blind external*, *subcutaneous* and of the *horseshoe* variety.

Openings.—The number and location of the fistulous openings are subject to wide variation. This is particularly notable with reference to the *external* openings, which may vary in number from one to a dozen or more, and in location from a fraction of an inch to a dozen or

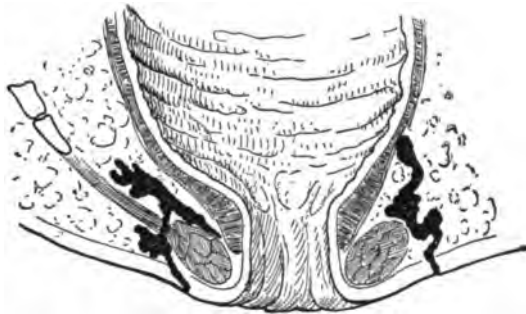


Fig. 72.—Incomplete fistula (blind external).

more inches from the anus. In the average case not more than two or three external openings, situated within a like number of inches from the anus, are to be expected (Fig. 76).

The *internal* opening is far more constant in these respects. As a rule there is only one internal opening and that one located in the anal canal between the two sphincter muscles, usually at or near the posterior commissure (Fig. 77).

It may be said in this connection that the typical fistula, *i.e.*, a straight sinus connecting the interior of the bowel with the skin surface by single openings, exists chiefly for purposes of description. In practice it is rarely encountered.

When it is said that abscess is the cause of fistula, practically the whole truth upon the subject has been told. It is true that penetrating wounds which enter the rectum may become infected and result in chronic sinuses without the formation of primary abscesses; but such accidents, while a few have been recorded, *e.g.*, *gunshot* wounds, falls upon pointed objects, etc., are so rare that instances of fistula produced

in this way may be considered as merely the exceptions which establish the rule.

An interesting question in connection with the etiology is as to why a perirectal abscess does not heal as kindly and completely as abscesses in other localities. First, again emphasizing the fact that fistula is not a necessary sequence of abscess,—that under proper treatment the latter can be made to heal perfectly in the vast majority of cases,—the peculiar susceptibility of this region to the formation of fistula cannot be denied. Where an opening upon the mucous surface exists the explanation is



Fig. 73.—Submucous fistula.

sufficiently obvious in the constant reinfection by contaminating material from the bowel. And it is highly probable that such an opening, often too minute to be detected, is present in a large percentage of cases. Pus, here as elsewhere, naturally extends in the direction of least resistance, which is almost invariably inward, toward the bowel. Even in cases where drainage has been established early the rectal wall is apt to form the internal boundary of the abscess cavity; and, though no perforation into the rectum is demonstrable, it is reasonable to believe that the avenue through which the primary infection occurred may persist indefinitely. This is far more likely than any explanation based upon the possibility of gaseous osmosis or bacterial migration through an intact mucosa.

Another factor which must be taken into account is the muscular activity inseparable from the region in the carrying on of the bowel

function. The cardinal principle in the repair of an abscess is *rest*, and the more complete this is the more rapidly does healing take place. In the nature of things the outlet of the bowel must participate in repeated movements, which are necessarily multiplied in the presence of a local irritation, the process of granulation being thus seriously interfered with.

From the standpoint of etiology a fistula may be considered as an unhealed abscess. To discuss in detail the several etiologic factors



Fig. 74.—Subcutaneous fistula.

would be merely to repeat what was said in the previous chapter upon the causation of perirectal abscess.

SYMPTOMS.

From what was said of the etiology, it follows that the usual symptoms of abscess have been present at some previous time in practically every case of fistula. A most advantageous impression may sometimes be made upon a patient by anticipating him upon this point and proceeding to describe in general terms the experience through which he has passed.

The symptoms of fistula proper, as contrasted with those of abscess, appear of minor importance. Pain is usually absent, and seldom amounts to more than discomfort in any case. There may be tenderness upon

sitting down and certain movements may be accompanied by a sense of local irritation. The act of defecation is generally free from pain and irritability of the sphincter is uncommon. There is ordinarily no constitutional disturbance.

The chief source of the discomfort in the majority of cases is the chronic discharge. This is thin and seropurulent in character, and

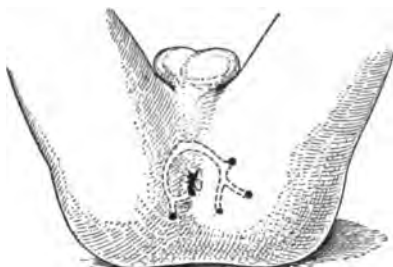


Fig. 75.—Horseshoe fistula.

usually of an irritant quality. As a result, particularly when personal cleanliness is neglected, the parts in the vicinity of the external orifice are apt to become excoriated, and pruritus of a most annoying nature is likely to develop. In such cases an offensive odor may be constantly present and constitute one of the most serious causes of complaint. In

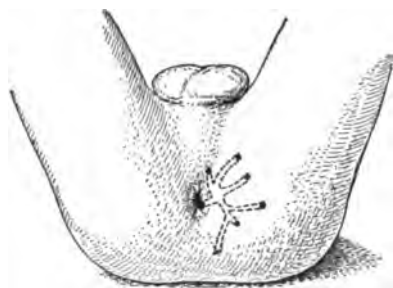


Fig. 76.—Fistula with multiple external openings.

cases of complete fistula the more or less frequent escape of gas and excrement from the bowel may greatly exaggerate the latter symptom and add materially to the patient's discomfort.

When for any reason the sinus becomes obstructed and the discharge arrested real pain may be experienced. This is due to the tension of the retained discharges, and promptly disappears when an exit is found, whether at the same or a new orifice. Multiple external openings are often to be explained in this way.

Blind, or incomplete, internal fistula differs in certain of its symptoms from those which have a cutaneous orifice. The differences are all traceable to imperfect drainage. Instead of a continuous discharge, it is here intermittent, occurring usually at or immediately subsequent to defecation when peristalsis, pressure and the action of the anal muscles combine to produce its expulsion. In the intervals the internal opening is kept closed by the normally contracted condition of the anal canal, or, when the opening exists at a higher point, the discharge collects in the rectum, if the sinus is so placed as to

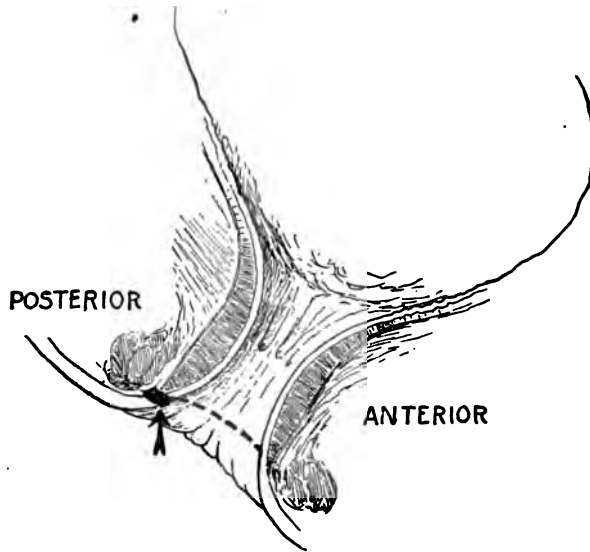


Fig. 77.—Usual site of internal openings. Anus in anatomic position. Dotted line indicates area between sphincters; arrow points to most usual site of opening.

favor drainage in that direction. As a result the pus is not only confined in the sinus or pocket, but, by constant reinfection from the bowel, what may be termed an acute condition of the lesion is maintained. Thus pain and tenderness may be very much more pronounced than in the other varieties.

In this form of fistula irritability of the sphincter and pruritus are both more apt to be encountered. The discharge passing over the tender anal tissues necessarily produces more or less irritation, and painful excoriations and fissures are often present. Altogether we may say that blind internal fistula as a rule gives rise to far more distress to the patient than the other varieties of the malady.

DIAGNOSIS.

It is contended by some that the determination of the exact location of the internal opening is the most important feature connected with the diagnosis of fistula. This is desirable, but not always possible; and certainly, if operation is to be the treatment employed, the importance of determining this point in advance is not great. Of course, in the abstract, it is always well to ascertain all that can be ascertained about any case in hand before undertaking the treatment; but no vital error is committed when the site of the internal opening is left to be determined at the time of operation. Indeed, the prolonged and painful manipulations sometimes necessary to clear up this point may be beyond the endurance of the patient.

An increasingly large proportion of patients have an accurate idea of the nature of their trouble. In fact it is not at all unusual in private practice for the conference to be opened by the patient with the statement that he has a fistula. But the time is rarely lost which is spent in obtaining a history of the case, which should include both the family and personal histories as well as a full description of the trouble for which relief is sought. When this is done and the symptoms elicited have received due consideration, the invariable physical examination should follow. Careful inspection will at once disclose any external openings. As a rule, in old cases, these are found in the centers of elevated papillæ, though sometimes they occupy depressions and occasionally, *e.g.*, in tubercular fistulæ, are marked by considerable loss of substance. When the number and location of the external openings are determined, much information as to the extent and course of the tracts may be gained from palpation of the region. The sinus is detected by the induration which surrounds it, and it is often possible to trace its entire course by this method alone.

The method of examination usually first resorted to is exploration with the probe. In a certain proportion of cases the instrument will with little effort pass readily along the tract into the bowel. If an obstruction is encountered, bending the tip of the probe and gentle manipulation in various directions may accomplish the object. It is well to refrain from introducing the finger into the bowel until the probe has been passed as far as possible, so that the sinus will not be rendered more tortuous by contraction of the sphincter. When there are several external openings first one and then another should be tried until the main or primary tract is located.

The clinical location of the internal opening is sometimes very difficult, but may be much simplified in the majority of cases by

remembering (1) that there is usually only one in a given case; (2) that as a rule it is situated in the anal canal, generally within less than one inch of the anal orifice. Oftentimes it is not difficult to determine this point by the trained finger without the use of speculum or probe. When necessary to use instruments, as may happen even in the most expert hands, the small conical speculum with a single or double sliding window will prove least objectionable. When introduced, careful inspection of all parts in turn and gentle search of every suspicious point with a fine bent probe should be made.

Another method sometimes resorted to consists in injecting a colored fluid through the external opening and endeavoring to locate its point of escape into the bowel. A solution of methylene blue, tincture of iodine, etc., may be used for this purpose. A good plan is to insert the finger into the bowel before the injection is made and note the point stained upon its withdrawal. The tincture of iodine is probably the best agent for this purpose, though it should always be diluted or employed in small quantity. If this method fails, the speculum may be introduced and direct vision depended upon to mark the point of escape of the colored fluid injected.

The above several methods of locating the internal opening are described in deference to the prevalent idea of the essential nature of the information. But the author would again emphasize that the accomplishment of the object will in many cases illy repay the time and effort required. In the average case it is much easier and more satisfactory to all concerned to defer the matter until the time of operation, when the sinus may be readily traced in all directions from the external opening. The examination should always be concluded with a thorough digital exploration of the rectum. By this means the existence of a stricture, neoplasm, or other pathology bearing upon the etiology and prognosis of the case may be detected, and much other valuable information gained.

PROGNOSIS.

Generally speaking, so far as concerns the life of the victim, the prognosis of fistula may be said to be good. There is no doubt, however, that the vitality is often lowered and the health undermined by the malady. In addition, considerations of personal cleanliness and comfort justify the advice that the necessary measures to secure relief be resorted to in all cases. It is also justifiable to advise that there be no unnecessary postponement, since the result of delay is uniformly extension of the trouble, with corresponding increase in the amount of work and after-treatment required.

TREATMENT.

The treatment of fistula may be discussed under two general heads, *non-operative and operative*. Experience has abundantly demonstrated that the latter is far the more important class. Only in exceptional cases and for unusual reasons will non-operative methods of treatment be indicated. As a rule the patient may be emphatically advised that time and money will be saved, suffering prevented and a complete cure rendered more certain by submitting to the radical operation. In the rare cases in which this is contraindicated because of the type of the lesion or the presence of some forbidding constitutional condition, it may be necessary to resort to a less dependable method of treatment; but in such instances a full explanation should always be made and a guarded prognosis given.

The *non-operative* measures worthy of mention are (1) the application of irritant agents; (2) the elastic ligature; (3) the use of bismuth paste. In complicated cases with several secondary sinuses and multiple external openings little is to be hoped for from any of these measures. In complete and incomplete external fistulas of recent origin in which single sinuses exist, a cure may sometimes be effected. The incomplete internal variety is obviously unsuited to the employment of measures of this kind.

1. The **application of irritant** agents may be made either by means of the probe or by injection. A point to be emphasized in this connection is the importance of providing adequately for drainage, by dilating or, if necessary, freely incising the external opening. Nitrate of silver, fused on the end of a probe or a 20 to 25 per cent. solution applied by means of a pledget of cotton twisted about the tip, is the most generally employed agent of this class. The application should be made to the entire fistulous tract. It is sometimes attended by considerable pain and the patient should be instructed to remain off his feet for at least twenty-four hours.

Many varieties of stimulating injections have been employed. Of these tincture of iodine is probably the most serviceable. If used in full strength, only a small quantity should be injected at one time, as the reaction is often severe. Other agents of this class are a solution of nitrate of silver 15 to 30 grains to the ounce, a 1 : 250 solution of formalin, a 5 to 10 per cent. solution of copper sulphate, pure carbolic acid, etc. It will usually be necessary to repeat the injections many times, the intervals between them being determined by the character of the local reaction and the general progress of the case.

2. The **elastic ligature** was at one time a popular method of treatment. Recently it has fallen into disuse and is seldom even referred

to in the literature of the subject. Yet it is certainly the best of the non-operative measures and in carefully selected cases may be expected to yield good results, if properly applied. Its chief disadvantages are the continuous and sometimes excessive pain it is likely to cause, and the great difficulty of determining in advance the suitability of the case. Among the advantages it offers may be mentioned the facts that a general anesthetic is not required and that the patient is not confined to bed while the cure is being effected, and the absence of hemorrhage (Fig. 78).

The only kind of fistula to which this method of treatment is



Fig. 78.—Elastic ligature applied.

applicable is the complete fistula having an approximately straight sinus, without branches, connecting the external and internal openings. It is especially indicated in those cases in which the internal opening is located above the internal sphincter, as it is less likely to be followed by incontinence than when the knife is used.

The best material for the ligature is the small, round, solid-rubber cord which is carried through the fistulous tract by means of a probe with a thread attached. A special instrument known as the ligature carrier (Fig. 79) may be employed; but the probe, on account of its flexibility, can often be made to follow the course of the sinus more readily and accurately. When the sinus is traversed by the ligature one end is brought out through the anus and tied tightly or fixed by means of a shot or plate to the end emerging from the external opening.

If drawn sufficiently tight, no readjustment will be required and the tissues embraced by the ligature will be completely severed. The length of time required to effect this result will of course vary with the bulk and character of the tissues to be divided. The process is comparatively slow, but the wound is always much smaller than would have followed division with the knife, and complete healing, as a rule, requires less time. As compared with other non-operative methods, the elastic ligature possesses the decided advantage of a far greater certainty of cure. As compared with the method of operation by incision, its main defect is its restricted field of application; for while a much longer time is required to sever the tissues, a correspondingly shorter time is usually required for the healing. When the preference of the average patient is consulted it will generally be found that the pain incident to the method is a less weighty consideration than the avoidance of an operation with the knife.

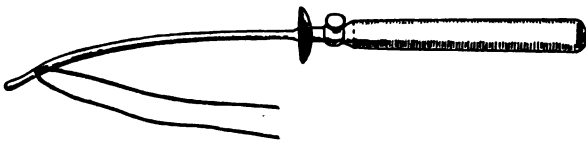


Fig. 79.—Elastic ligature carrier.

3. Bismuth Paste.—This method of treating fistulas was given to the profession by Dr. Emil G. Beck, of Chicago. Though of comparatively recent origin, it has been employed often enough to establish its claim to value in the treatment of rectal fistula.

The paste, usually designated as Beck's paste in honor of its originator, is a $33\frac{1}{3}$ per cent. mixture of subnitrate of bismuth in sterile vaselin. It is used by melting it over a water-bath and drawing it into a well-warmed piston syringe holding about one ounce. The syringe nozzle should be of the proper size to accurately fit the external opening through which the paste is to be injected. If more than one external opening is present, all except the one to be utilized are guarded by pressure with compresses in order to prevent escape of the material. The injection is made with sufficient force to insure the paste being carried into and completely filling all sinuses, though it is important not to force it into healthy tissues. The paste congeals quickly at the body temperature. This may be hastened by the application of an ice-bag for a few minutes immediately following the injection. The treatment should be repeated on the average about twice a week, being preceded each time by irrigation of the sinus with

peroxide of hydrogen or other cleansing agent, if the discharge is free and purulent.

Unlike the two non-operative methods previously described this method is applicable to the most extensive cases; in fact its chief claim to favor is that it may be used in cases which are unsuitable for operation either on account of the extent or pathology of the local condition, or the general health of the patient. In addition, used in conjunction with the X-ray, it furnishes a valuable aid to diagnosis in certain old extensive cases. When properly employed for this purpose the various pockets and ramifications of the fistulous tracts are accurately revealed, and the operative work greatly simplified.

The curative action of the remedy is supposed to depend upon gradual hydrolysis of the bismuth ingredient, with the slow liberation of nitric acid, which acts as an irritant to the tissues. If improvement is not apparent after the first few treatments, failure will very likely result. In such cases reinfection from the bowel or from a branch sinus not reached by the paste will often be found to explain the failure.

Pennington¹ reports a series of 17 cases treated by this method, with an ultimate result of 65 per cent. of cures, though he frankly states that this proportion was not maintained in subsequent cases.

The Operative Treatment.—At the outset of the consideration of the operative treatment it should be emphasized that the surgical management of rectal fistula is not the simple matter it is sometimes assumed to be. As demonstrated clinically by the average general surgeon and as described in the average textbook on general surgery, the disease is one of only minor importance and its operative cure so easy as only to deserve passing notice. The high percentage of failures which follows the operation in general surgical clinics is sufficient evidence that the importance of the subject is greatly underestimated. To state a truth which is most fully realized by those of largest experience, the proper management of rectal fistula demands as sound judgment and as high degree of surgical skill as the majority of intra-abdominal lesions. Indeed, unsuccessful operations are far less frequent in the latter than in the former class of cases. Because the region involved is not a vital one, and because fatalities seldom result from carelessness and error, it would seem that rectal surgery has not received the serious attention from the profession which is its due, and which it must receive if it is to be redeemed from the hands of those who prey upon the ignorance and credulity of the public.

Three methods of operating will be described: (1) fistulotomy; (2)

¹ "The Treatment of Rectal Fistula," *The Proctologist*, Sept., 1910, p. 155.

simple incision, and (3) incision or excision (fistulotomy) with immediate suture.

1. **Fistulotomy.**—Little is to be said in commendation of this procedure. It consists of incising the entire length of the fistulous tract from within with the hope that the resulting reaction and granulation will bring about its closure. The operation may be performed by means of a slender probe-pointed scalpel or, more easily, by means of a special instrument known as a fistulatome (Fig. 80). The latter embodies the principle of the familiar urethrotome, with two concealed knives, and is manipulated in a similar manner. It is introduced through the sinus from without, the blades made to project, and the instrument quickly withdrawn, thus severing the full length of the fibrous walls on opposite sides. If the scalpel is used the manipulation should be repeated one or more times. It is quite obvious that this operation, like the several non-operative measures heretofore described, is exceedingly limited in its application, only the fistula which has an external opening and a



Fig. 80.—Fistulatome.

single straight tract being at all adapted to it. The method is not now in vogue to any extent. It was formerly claimed by certain enthusiastic advocates that a single application often resulted in a cure; but it is well for those who resort to the procedure to be prepared to repeat it many times,—and also to be disappointed. If resorted to, the sinus should first be well cleansed with an antiseptic solution and anesthetized by applying a strong solution of cocaine for several minutes before the operation. Satisfactory anesthetization is always difficult and frequently impossible to accomplish on account of the character of the lining membrane.

Any advantages which this method may possess are of little importance compared with the positive dangers of hemorrhage and reinfection of the fresh tissues, with subsequent sepsis and the formation of new abscesses. These dangers together with the slight prospect of success far outweigh the single advantage of avoiding an anesthetic.

2. **Simple Incision.**—It will not be possible to discuss in detail the many modifications which will be required to properly adapt this method of operating to the great variety of cases encountered. After describing the technique in a typical case, therefore, it must suffice to indicate the definite, underlying principles upon which the success of the method is known to depend.

Preparation of the Patient.—It is of the utmost importance that this feature receive careful attention before the undertaking of an operation of any kind upon the rectum which will necessitate confinement to bed or the administration of a general anesthetic. It is especially important in fistula cases for the reason that so often it cannot be told in advance how extensive the operation will be,—an apparently simple case undertaken with local anesthesia may prove to be most formidable, requiring general anesthesia and far-reaching incisions in order to handle it properly.

Two days before the operation the patient should be placed on a restricted diet and an efficient cathartic administered. Broken doses of calomel ($\frac{1}{2}$ grain every two hours until 3 grains are taken), followed by castor oil ($\frac{1}{2}$ to 1 ounce), will meet the indications in the majority of cases. On the night preceding the operation the lower bowel should be thoroughly washed out, the perianal region shaved and an antiseptic pad applied. Two hours before the operation an enema consisting of a pint of boric acid solution may be given.

A preliminary course of intestinal antiseptics (betanaphthol, bismuth salicylate, zinc sulphocarbolate, guaiacol, etc.) is highly recommended by some authorities, the idea, of course, being to lessen the danger of postoperative infection. No objection can be urged to this practice; but, inasmuch as it is impossible to more than very imperfectly sterilize the contents of the alimentary tube by safe doses of any medicinal antiseptic, little real benefit is to be expected. If such agents are employed, they should be administered for at least three or four consecutive days previous to the operation.

It is entirely practicable to perform the operation in certain cases under local anesthesia. Such cases are exceptional, however, and can rarely be positively recognized if advanced, so that the patient should always be prepared as though for a general anesthetic in order that nothing may interfere with complete and thorough work.

On the day before and again at the time of the operation it is well to cleanse the fistula with injections of peroxide of hydrogen followed by an antiseptic solution. By this means the danger of infection may be considerably diminished. A 10 per cent. solution of methylene blue injected through the external opening not only acts as an antiseptic, but, by deeply staining the tissues with which it comes into contact, greatly facilitates the following up of any lateral branches.

The Operation.—The lithotomy position with the limbs supported by standards attached to the table or by means of a Clover crutch is the best for this kind of work. The patient having been properly adjusted, the sphincters should be well dilated and the interior of the rectum

irrigated with an antiseptic solution and gently but thoroughly cleansed with gauze or cotton mops. When the solution has drained away a gauze pack or sponge of ample size, with a thread attached and left protruding from the anus, should be introduced well above the field of operation so as to protect it from contamination by descending feces or fluids. At this time the location, size, etc., of the internal opening should be noted. The external parts are then carefully scrubbed and the operative area protected with sterile towels. The irrigating fluid for use during the operation proper should consist of normal saline solutions and should be at hand in abundant quantity.

Assuming now that the case is one of simple complete fistula with the internal opening located at the usual site, *i.e.*, in the anal canal distal to the internal sphincter, *the most important feature of the incision is to so place it that the external sphincter will be divided at right angles* (Fig. 81). If the direction of the tract is determined to be such as to insure this point, a grooved director having a probe end may be passed through it, the end of the director brought out through the anus, and the overlying tissues rapidly divided with knife or scissors. The better plan as a rule, however, is to enlarge the external opening and carefully follow up the tract by dissection until the muscle is reached, when it can be more accurately divided. The instructions found in some works on general surgery to pass the grooved director through the tract into the rectum, puncturing the wall of the bowel if the internal opening is not readily found, and then dividing the tissues by following the director with a curved bistoury and cutting from within outward, cannot be too strongly condemned. A cure is doubtless often accomplished by this ill-advised method; but equally certain failure often follows. And even should healing occur, the possibility of partial or total incontinence from faulty union is an ever-present menace, particularly when, as not infrequently happens under this slipshod method, the incision includes both sphincters.

When the incision has been made and any resulting hemorrhage controlled, all loculi should be broken down and lateral branches carefully sought for and divided. The entire fistulous tract should then be thoroughly curetted or, better in old cases, completely dissected out with curved scissors. Particular attention should be given at this point to the internal opening, where the mucous membrane will often be found undermined, with an occasional submucous tract. The latter should be divided to its farthest extremity and all devitalized tissue trimmed away.

The wound is then irrigated with a 1 : 2000 bichloride solution, packed with gauze sufficiently tight to prevent oozing, and an antiseptic pad applied and retained with a T-bandage. The patient should always remain in bed for a week or more, depending upon the size and nature of

the wound. A good rule is to insist upon the recumbent position until the process of granulation is well established. When allowed to get out the patient should be cautioned not to sit down, as the resulting pressure and bruising would seriously retard repair.



Fig. 81.—Operation by incision.

Important though the incision is, as much depends upon the after-treatment in these cases, or even more. Unless he is fortunate enough to have a thoroughly trained and reliable assistant the dressings should invariably be made by the surgeon himself. The first dressing may be left in place for forty-eight to seventy-two hours. Thereafter they should be changed daily and the wound irrigated. There is no occasion

to *pack* the wound after the initial dressing; in fact harm is often done by too great zeal in this direction. Only enough gauze should be introduced to hold the wound apart, thus insuring healing from the bottom.

The kind of irrigating solutions to be employed will depend upon the indications present. As a general thing they should be of a bland (normal saline) or sedative (1:250 carbolic acid) character for the first few days; thereafter, stimulating (1:2000 bichloride, 1:3000 permanganate, 1:1000 formalin, etc.). Peroxide of hydrogen is an efficient cleansing agent and is mildly antiseptic.

A variety of medicinal agents for application to the wound after irrigation may be used. A 15 to 25 per cent. solution of argyrol applied by means of a small cotton swab is perhaps the best in the average case. A 10 per cent. mixture of balsam of Peru in castor oil, a 10 per cent. ichthyol ointment, a 1 to 5 per cent. solution of nitrate of silver, and similar stimulating remedies may serve a useful purpose. Occasionally a wound will apparently do better with nothing more than the daily irrigations followed by the insertion of plain sterile gauze. The dressings should be timed to follow the regular evacuations of the bowels, and such others made as additional stools or the condition of the wound may necessitate.

The length of time required for complete healing cannot be accurately foretold. It is very apt to be longer than estimated in any given case following this method of treatment, and the utmost patience and perseverance must be exercised on the part of the patient as well as the surgeon. All manipulations connected with the dressings should be marked by gentleness. Too great force of the irrigating stream, rough handling of the wound, and dressings made with injudicious frequency may be expected to interfere with the progress of the case. Judgment in the after-treatment is the keynote of success.

3. Incision or Excision (Fistulectomy) With Immediate Suture.

—This method of operating contemplates the complete removal of the fistulous tract together with all diseased tissue, and accurate closure of the resulting wound by sutures with the hope of obtaining primary union. The advantages claimed for it over the more popular open method are that it accomplishes as good or better results in a much shorter time. And these advantages must be conceded, when the method is successful. Unfortunately, however, this is not always the case. Every few years seems to bring a revival of interest and enthusiasm with reference to the procedure; but the maxim “no suturing about the rectum” continues to represent the attitude of the majority of those of large experience in this department of surgery.

Theoretically it cannot be denied that the method is ideal. Its champions assert that it is so clinically as well, maintaining that, if primary union is not obtained, removal of the sutures will place the wound in as favorable condition for healing as after the open operation. The chief, and perhaps the only valid, objection which can be urged against it is that the high degree of skill and the perfection of surgical technique required to render success possible make it practically unavailable to any but the most expert operators. From the standpoint of the patient, at least, the few days or weeks which may be wasted in a vain attempt with the method are not negligible, and something more than a vague hope of success is necessary to justify resort to it.

The cases best adapted to the procedure are those in which a comparatively straight sinus without lateral branches connects an external with an internal opening. As before noted, such cases are rather exceptional and difficult to diagnose in advance; hence the operator should always be prepared to abandon the method when unfavorable conditions are encountered.

Certain cases in which the internal opening occurs high up the bowel are peculiarly suited to a partial application of this method. Here it is especially important, in order to avoid the danger of incontinence, that accurate union of the bowel wall be obtained,—a result much more likely to follow if this portion of the incision is sutured and the remainder left open. Even in the most complicated cases this plan may be advantageously adopted.

The preliminary preparation of the patient is the same as that already described for the open method. The field of operation should be even more carefully prepared and the strictest antiseptic precautions observed at every step. The incision may be made as described under the previous method and the diseased tissue carefully removed by dissection or with the sharp curette. This serves quite well in recent cases in which little induration has occurred in and around the sinus. In old cases it is better when practicable to pass a probe or grooved director entirely through the fistula and begin the work by making a longitudinal incision down to, but not through, the wall of the tract. Then by slow and careful dissection the incision is extended around all portions of the tract so as to lift it out *in toto* still threaded upon the probe (Fig. 82). The next step and one of the most important is to control all hemorrhage, including oozing. Several tension sutures, preferably of silkworm gut, are then introduced, the number depending upon the length of the incision. One of these is made to include the severed ends of the sphincter muscle and all are left untied until the

suturing is completed. Beginning at the deepest part the sides of the wound are then accurately approximated with mattress sutures of catgut, several layers of which may be required, and the edges of the incision brought together with a running suture of the same material. The latter is best started at the highest point of the incision inside the bowel. The tension sutures are then tied over a strip of sterile gauze to prevent their cutting out, the protective packing gently withdrawn from the rectum, and an antiseptic dressing applied (Fig. 83).

The bowels should not be allowed to move for four or five days, an opiate being administered from time to time if necessary. After



Fig. 82.—Fistulectomy, probe through sinus.

this time, each action should be preceded by an enema followed by an ounce of carbolized olive oil (2 per cent.), and the wound cleansed with an antiseptic solution. If all goes well, union will be sound and complete in two weeks.

Should local or constitutional signs of sepsis develop during the progress of the case, a sufficient number of the sutures should be removed to provide drainage, and the wound irrigated with an antiseptic solution twice a day. The tension sutures, particularly the one through the sphincter, should be left in place as long as they give rise to no trouble. If it should become necessary to remove all the sutures the wound should be thoroughly cleansed to the bottom and treated thereafter as though they had not been used.

The operative technique varies somewhat in the incomplete varieties of fistula.

Blind (Incomplete) External Fistulas present no special difficulties. Here it is only necessary as a rule to lay the tract open freely from the external orifice so as to insure drainage and provide access for treatment. These cases are usually of recent origin and heal promptly.

There is nothing to justify the practice of converting a blind external into a complete fistula by puncturing the gut wall with the grooved director as the first step of the operation, and then proceeding to incise the sphincter as well as the original sinus. Such a plan at once adds many days to the period of healing; and, while in exceptional cases it may prove to be necessary, it is always advisable

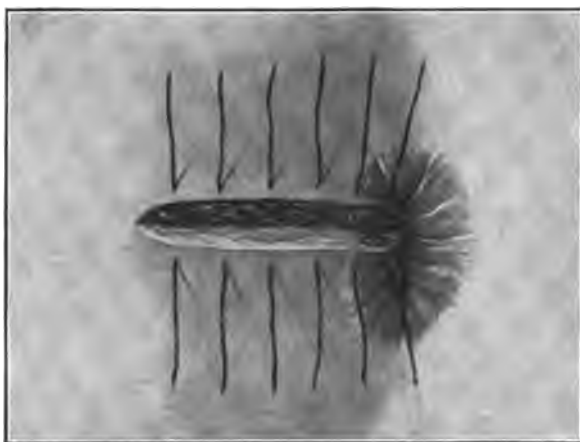


Fig. 83.—Fistulectomy, sutures.

to give the patient the benefit of the doubt and reserve this step until it is demonstrated that complete repair will not occur without it.

The operation in this type of cases may readily be performed, in the majority of instances, under local anesthesia. The after-treatment involves the same principles as those already described, namely, daily irrigation with an antiseptic solution, suitable applications, and gentle packing with gauze.

Blind (Incomplete) Internal Fistula is by no means so easily managed. Even after the discharging orifice is located, great patience and skill are often required to determine the direction and extent of the tract or tracts. When the diagnosis of blind internal fistula is definitely made, it is usually better to defer further investigation until the patient is placed under an anesthetic for the operation, since in this condition the parts are usually exceedingly sensitive and the

necessary manipulations prolonged and painful. Local anesthesia is not suited to this type of cases.

When the sphincter has been divulsed the tract may be explored with a bent probe. If it passes outward into the ischiorectal fossa, the tip of the probe may often be felt, when it should be cut down upon, thus converting the fistula into the complete variety. Gant has devised an ingenious modification of the grooved director for this purpose (Fig. 84), which may prove quite useful in certain cases.

It will sometimes be found that the sinus runs upward parallel with the bowel for a considerable distance. In such event it should be freely laid open, bearing in mind the danger of hemorrhage when the bowel wall is incised above the internal sphincter. Should hemorrhage occur and the application of a ligature be impossible, it is better



Fig. 84.—Gant's angular director.

to apply a long-handled pressure forceps to the bleeding vessel, and leave it in place for twenty-four or thirty-six hours, than to depend upon packing with gauze. The resulting wound in these cases of submucous fistula is treated as though it were due to an ordinary ulcerative process.

In some cases the tract may be so tortuous that a probe cannot be made to follow it. Here dependence must be placed upon detecting the induration usually present by palpation, and cutting down upon it from the outside. Any effort to provide drainage by enlarging the internal opening, hoping thus to effect a cure, is practically certain to result in failure. Laying open the sinus and all diverticulæ from end to end is the only method of treatment to be advised. Should the opening be above the internal sphincter, immediate suture of the portion of the incision involving the bowel wall would be indicated, if the open operation were performed. In such a case, however, it would be preferable to convert the fistula into one of the complete variety by a counteropening, and first attempt to effect a cure by a less heroic method, as described in another portion of this chapter.

COMPLEX FISTULA.

Complex fistulas may be met with under many forms and present a variety of perplexing problems. To facilitate description they may be divided into three groups: (1) fistula with multiple external openings; (2) horseshoe fistula, and (3) fistula with multiple internal openings.

1. Fistula with Multiple External Openings.—Perhaps the majority of all cases of fistula have more than one cutaneous orifice. The number may be very large. Goodsall and Miles² record a case, with photographs taken before and after the operation, in which there were 43 external openings. The highest number present in any case ob-

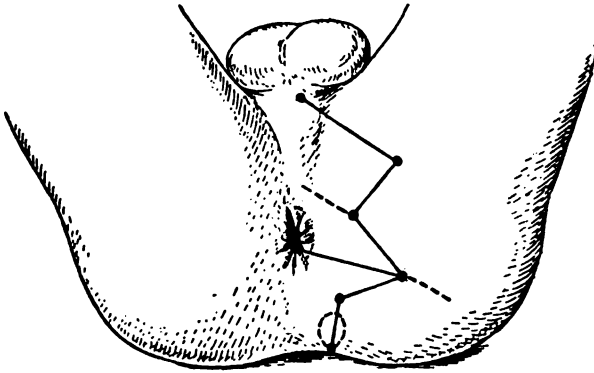


Fig. 85.—Complex fistula. (Author's case.)

served by the author was 13. Usually, these secondary openings occur upon the side of the anus corresponding to the primary abscess and may be limited to it. Almost without exception they will be found to connect with the original sinus. The term "watering-pot fistula" is sometimes applied to these cases.

Fortunately a multiplicity of external openings bears no relation to the number of internal openings. With rare exceptions the latter is single in these cases and the condition owes its gravity rather to the extensiveness of the operative work required than to the danger of incontinence (Fig. 85).

Any attempt to cure this type of case by other than the open incision will only result in a waste of time. The wounds following the application of this method in certain cases are formidable to behold; but, unless

² Diseases of the Anus and Rectum, part i, pp. 113-14-15.

the patient's general condition forbids the complete operation at one sitting, the knife should not be laid aside until every tract has been carefully sought out and laid freely open. If possible to locate it, the primary tract should be the one first incised, after which the grooved director may readily be introduced through the other external openings in turn and the secondary sinuses laid open into the original incision or into each other. A probe passed through the internal opening will sometimes prove the easiest method of determining the primary tract.

It is important in operations of this kind not to sacrifice more tissue than necessary. Wherever possible, tongues and strips of healthy skin should be left so as to facilitate repair and lessen the size of the

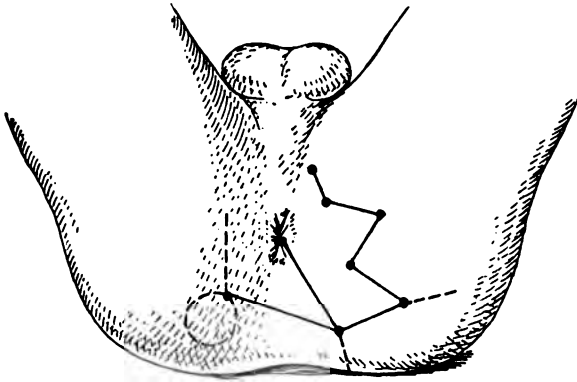


Fig. 86.—Horseshoe fistula. (Author's case.)

resulting cicatrices. Complete healing will sometimes require months, but improvement in the patient's general health will usually be noted from the outset, due to the immediate decrease of septic absorption following the operation.

2. **Horseshoe Fistula** is the designation applied to that special variety of the disease in which the sinus partially surrounds the rectum, crossing from one side to the other either anteriorly through the perineum or posteriorly in front of the coccyx (Fig. 86). The latter is the more common form. In rare instances there may be both an anterior and a posterior connection, in which event the term double horseshoe or circular fistula would be applicable. There may be one or many external openings. Usually only one internal opening is present, which, in the commoner variety, will be found at or near the posterior commissure. All of the external openings may be situated upon the same side of the anus, in which event the portion of the fistula extending

into the opposite side will be of the blind, or incomplete, type. It must be remembered in this connection that a horseshoe fistula may be altogether of either the blind external or blind internal variety, though both of these special varieties are of very infrequent occurrence.

Many different methods of managing horseshoe fistula have been suggested. Generally speaking, open incision of the entire fistulous tract together with any lateral branches is to be preferred. In the anterior variety the connecting sinus traversing the perineum is usually quite



Fig. 87.—Fistula with multiple openings external and internal, occurring in a case of stricture.

superficial, and the method of immediate suture may sometimes be employed to advantage.

In posterior horseshoe fistula, on the contrary, the connecting tract is always deeply placed, *i.e.*, proximal to the tendinous attachment of the external sphincter, and the lateral tracts or cavities often extend forward into the perineum or, in the female, into the labia. In such cases it is obviously impracticable to apply the method of closure by immediate suture. One of the most important considerations in these cases is to avoid the retraction of the anus which would be likely to result from a too free severing of its attachments by the open incisions. This may sometimes be done by confining the incision to one side and treating the

other side by curetting and drainage. The tract leading into the bowel should, of course, be laid open,—always so as to divide the sphincter squarely across. When free drainage is thus provided for and the after-treatment is intelligently managed, healing may be as prompt and complete upon the unopened side as upon the other.

The internal opening in posterior horseshoe fistula, particularly in cases of long standing, is usually large and may readily be detected by

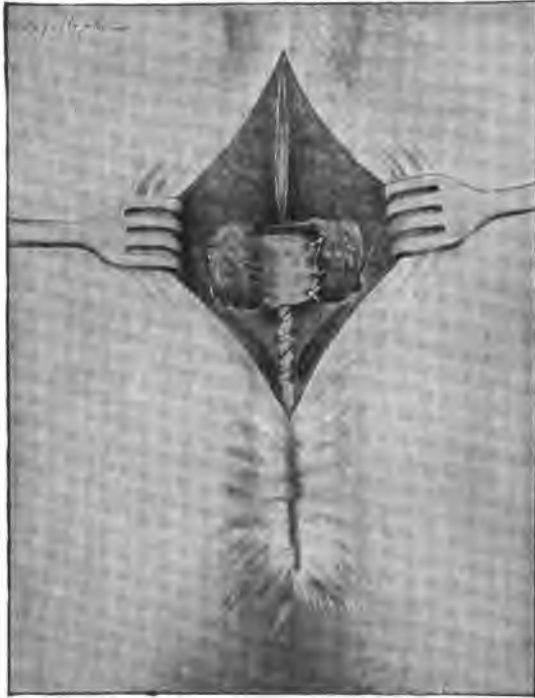


Fig. 88.—Rectourethral fistula.

the finger. If the operator prefers, the primary tract may first be laid open and the subsequent steps of the work then planned to meet the special indications.

There is nothing inherently difficult about the treatment of this form of fistula, though the contrary idea prevails rather widely. The same principles apply as in the management of the simpler varieties. When failure results, it may usually be traced either to timidity in the operator or to lack of sufficient care in the details of the operation.

3. Fistula with Multiple Internal Openings.—There is good reason to regard the presence of more than one internal opening in a case

of fistula as due to a coincidence. The condition is, comparatively speaking, exceedingly rare, and in the majority of instances encountered is probably the result of the formation of independent abscesses with subsequent conjunction of their cavities or tracts. The primary stage of such a condition, *i.e.*, the coexistence of two or more separate and distinct abscesses or the formation of an entirely new abscess in a patient already the subject of a fistula, is by no means unique, and it is not difficult to conceive of extension of the disease process until coalescence occurs. In the author's experience the condition has been encountered chiefly as a complication of syphilitic stricture of the rectum. One or more of the internal openings may be located above the usual site.

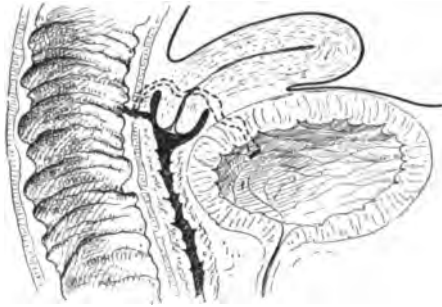


Fig. 89.—Rectovesical fistula.

Particularly is this true in stricture cases in which the infection and abscess formation occur in immediate proximity to the area of stenosis (Fig. 87).

It may be safely assumed that section of the sphincter at the site of each internal opening will be required to effect a cure. But it is of the highest importance not to divide the muscle in more than one place at a time, though this has often been done without resulting in incontinence when the incisions involved the external sphincter only. If one has sufficient confidence in his technique, he may complete the operation at one sitting, relying upon immediate suturing of a portion or all of the wound to eliminate the danger. A safer plan, perhaps, in the average case and in the hands of the average operator is to perform the operation by stages, first dividing the sphincter at one point only and laying open the balance of the fistulous tract to the other internal opening. When union of the muscle has occurred at this point, any necessary supplemental incision may readily be made under local anesthesia. As a rule the internal openings are not more than two in number, and the one remaining may sometimes, by careful treatment, be made to heal without incision by the

time, or even before, union of the muscle has occurred at the point of section.

Various special forms of fistula are met with in this region in which other organs as well as the rectum are implicated. Most usually these are designated by combination names derived from the parts involved, as rectourethral (Fig. 88), rectovesical (Fig. 89), rectovaginal, etc. Other varieties may originate in disease of the contiguous osseous structures, *e.g.*, coxitis or necrosis of any portion of the bony pelvis. In addition, it must be remembered that pus from suppurative processes involving any of the viscera of the pelvis or lower abdomen may find an outlet in the perianal region or at some point in the rectum, resulting in fistulous tracts of a most serious and obstinate nature.

The management of this type of fistula, as a class, constitutes one of the most difficult problems in surgery. Discussion of the subject cannot be undertaken here. It must suffice to say that, whatever the origin of the disease and whatever other organs may be involved, the principles of treatment already laid down will hold good so far as pertains to the special parts with which this treatise is designed to deal.

PLATE XI.



Incontinence of feces.

CHAPTER XII.

Complications of Fistula Operations; Fistula and Tuberculosis.

COMPLICATIONS OF FISTULA OPERATIONS.

SHOCK, hemorrhage, and sepsis are complications which may be met with in any kind of surgical operation. The principles underlying their prevention and management are so well understood that no detailed discussion of them in this connection is necessary.

There are, however, certain complications or, more correctly speaking, sequelæ liable to be encountered in the surgery of anorectal fistula which demand more than passing notice. The most important of these is incontinence of feces. Others are persistence or recurrence of the discharge, prolapse of internal hemorrhoids or of the mucous membrane, and premature or vicious healing.

Incontinence of Feces.—This is a sequel rather than a complication. It is unquestionably one of the most unpleasant conditions in which a patient can be placed and one for which the operator, however excusable, is seldom wholly forgiven. Formerly its occurrence was by no means infrequent following fistula operations, and even today it is met with far more often than would seem possible in view of our positive knowledge as to its cause and prevention. In strict justice, however, it should be said that incontinence rarely follows an operation in the hands of a competent proctologist. It is with few exceptions the surgeon who regards fistula as a trivial malady and disregards the elementary facts of anatomy and physiology in his work who must bear the burden of blame. (Plate XI.)

Fear of this result deters many a sufferer from seeking relief,—a fear which the “no-knife” advertising charlatan instills and plays upon with profitable persistence. If every surgeon who undertakes the operation had the same salutary respect for the sphincter muscles as the average patient, fewer disasters would happen and there would be fewer fistulas of “about twenty years’ standing” in existence.

The external sphincter is absolutely essential to voluntary bowel control. The internal sphincter offers a certain involuntary barrier to the passage of formed or costive stools, but it is wholly inefficient in the

presence of loose or liquid feces. Nothing is to be feared from a complete division of the external sphincter at one point, provided the section is made at a right angle to the direction of the muscle fibers and the after-treatment is intelligently attended to. The claim that it can be *safely* divided in two or more places at the same time is certainly dangerous teaching. Without discrediting the few cases reported in which the latter practice was followed, it is highly probable that one or more of the incisions involved only the superficial portion of the muscle and that, if completely divided at all, it was not at more than one point.

A single high incision in which the internal sphincter is divided is very apt to be followed by incontinence, unless the method of immediate suture is successfully resorted to. Fortunately such an incision is required only in the rarest instances. When found to be unavoidable, even though the operation is already begun, it should be postponed unless the operator is prepared and is competent to meet the indications.

The foregoing observations refer to the prevention of the complication. When the condition is present, what are the possibilities of correcting it and how shall it be done? With regard to the first question, —there is always a reasonable hope of restoring, or at least improving, the function of the muscle, except in old cases in which from long disuse complete atrophy has occurred. This is sometimes the case to the extent that the muscle fibers are utterly incapable of identification, resembling and being inseparable from the adjacent connective tissue. In such a condition nothing more than palliation can be hoped for.

Treatment.—Three methods of treatment are worthy of consideration: (1) linear cauterization; (2) plastic operations, and (3) colostomy.

1. *Linear cauterization* may be tried in recent cases in which the incontinence is only partial. The purpose of this method is to induce a permanent contraction of the anal orifice, thus supplementing the function of the weakened sphincter. The technique of the procedure is fully discussed in the chapter on Prolapsus.

2. *Plastic Operations.*—It has been claimed that incontinence does not and can not result from a single division of the external sphincter. This is certainly not the case. If an end-to-end union of the severed muscle, without the interposition of an excessive amount of fibrous tissue, is not secured, some degree of incontinence is more than apt to follow. In such cases the cause will be found to lie either in the oblique direction of the incision with reference to the muscle fibers, or in the fact that the after-treatment was neglected. Indeed, a properly placed incision may be followed by a permanent weakening of the muscle, if the healing process is not carefully looked after, a deep V-shaped sulcus (Fig. 90) being sometimes left between the severed ends, or the ends

being caught in the scar tissue and the muscle on that side so elongated or distorted as to render it physically impossible for the anus to be tightly closed.

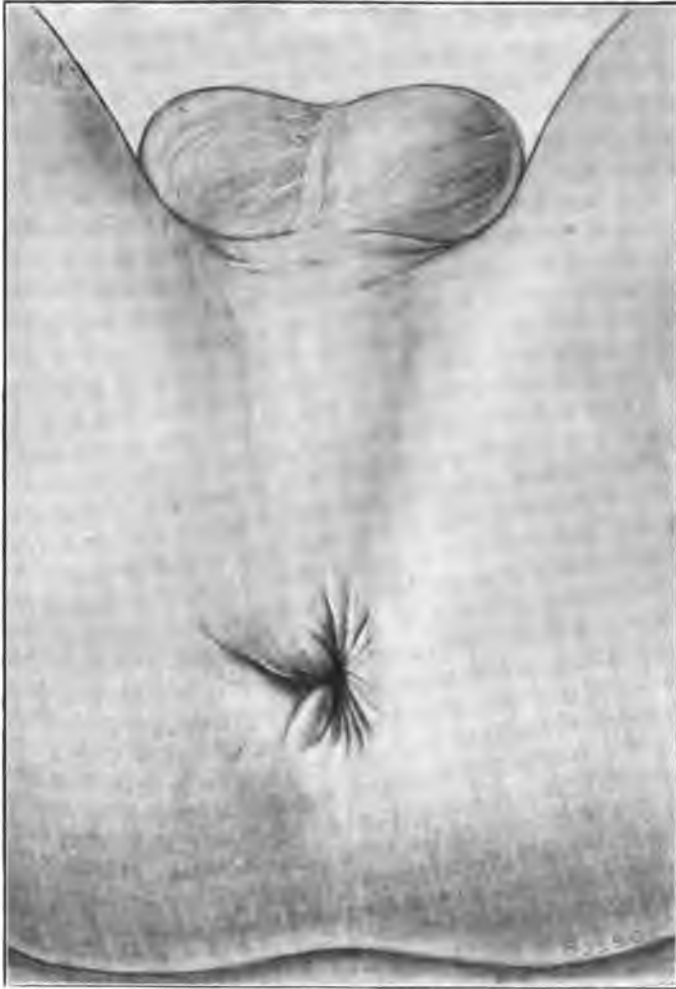


Fig. 90.—V-shaped sulcus after cicatrization.

The design of operation in these cases is to restore the continuity of the muscle by reuniting the severed ends in as nearly a normal relation as possible. To accomplish this it is not sufficient to merely freshen the edges of the incision and bring them together with sutures. The ends of the muscle must be freed by careful dissection, the beveled edges, if

any, trimmed away, and the sutures so placed as to accurately approximate the muscle fibers in their original relation. Chromicized catgut is the best material for the buried sutures. It is important not to sacrifice any portion of the mucous membrane. To obviate this the dissection may be begun with an anteroposterior incision at the inner margin of the sphincter and the mucosa first freed to the full depth of the muscle. When the operation is completed this incision should be carefully sutured with plain sterile catgut, thus effectually protecting the wound from contamination by the bowel contents. After the dissection is complete it is well to place a deep tension suture of silkworm gut through the two ends of the muscle, introducing it through the skin a half inch or

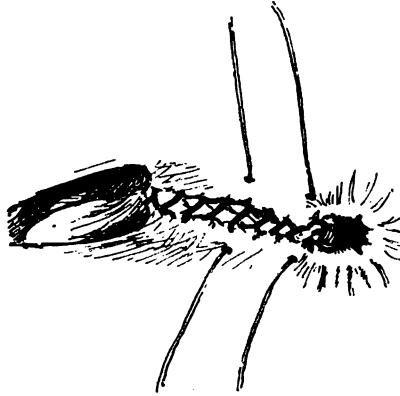


Fig. 91.—Dissection and sutures. Mucous flap for repair of sphincter.

more from the edge of the incision and bringing it out at a corresponding point on the other side of the incision. This suture is tied over a small roll of gauze after the buried sutures have been placed, and allowed to remain forty-eight hours, or longer if well tolerated (Fig. 91).

The bowels should be confined for four or five days, an occasional dose of some opiate being administered for the purpose, if necessary. At the end of this time a movement should be secured by enemas cautiously employed. A preliminary injection of several ounces of olive oil will do much to soften the feces and prevent damage.

Where the muscle has been cut on both sides it is advisable to confine the reparative work to one side at a time; otherwise, the tension is likely to be so great as to cause failure of the operation. Should two places on the same side require repair, however, there is no reason why both should not be dealt with at one sitting. In such cases special care should be exercised not to cut away more tissue than the nature and extent of the cicatrices demand.

The chief cause of failure in the operation is infection from the bowel. Preservation of the intact mucosa and carefully suturing it back in place, as already described, so as to protect the inner aspect of the wound constitute the most reliable means of preventing this unfortunate occurrence. With this object in view, J. R. Pennington¹ has suggested that the operation be begun by making a horseshoe incision with one leg on either side of the point at which the sphincter is to be repaired, and the closed portion extending well out into the sound tissues (Fig. 92). The flap is then dissected up so as to raise the subcutaneous fat with it, and turned back over the anus, the ends of the sphincter freed and reunited, and the flap replaced and sutured in position (Fig. 93). The pro-

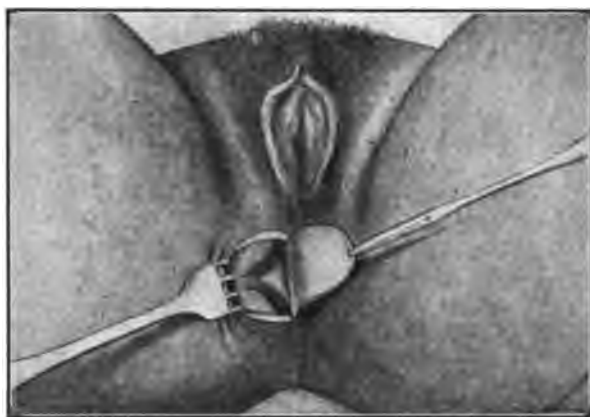


Fig. 92.—Pennington's horseshoe-flap incision. First step.

cedure is ingenious in conception and attractive in theory; but, aside from the difficulty of locating and identifying the muscle when approached in this way, the great liability of the flap to undergo necrosis from interference with its blood-supply is sufficient to condemn it.

Should infection of the wound occur, only enough of the sutures should be removed to provide for drainage and an effort be made by sedulous attention to prevent the necessity of repeating the operation. A single failure, however, should not cause despair. The most expert operators have been compelled to make more than one attempt before success was attained.

3. *Colostomy*.—Whether from the ravages of disease or as the result of faulty surgery, the sphincter will occasionally be found so

¹“Plastic Operations on the Sphincter Ani Muscle for Incontinence of Feces,” *The Medical Standard*, Jan., 1904.

nearly destroyed that restoration of its function by any kind of local operation or treatment will evidently be hopeless. In such event the formation of a permanent left inguinal anus will be the only recourse. While this is to be regarded as the remedy of last resort, its very real benefits should not be withheld from any patient who after a full explanation requests the operation. The technique of the procedure is described in a subsequent chapter.

Persistence or Recurrence of the Discharge.—Practically without exception this complication is the result of incomplete operation. A sinus or pocket having been left, the discharge either continues and in a few days is as copious as formerly or, when the suture method is em-

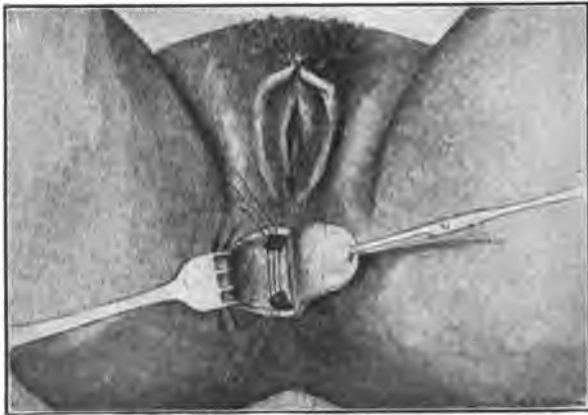


Fig. 93.—Pennington's horseshoe flap. Second step.

ployed, a day or so may elapse before the increase in pain and swelling makes it apparent that a reinfection of the wound has occurred. Time will be saved in these cases by administering an anesthetic and searching for the source of the trouble as soon as the condition is recognized. Healing will not occur under any kind of treatment until the offending focus has been found and removed.

The appearance of an unusual amount of purulent discharge at any time during the postoperative progress of a case should always arouse suspicion. It may be that a secondary abscess has formed and ruptured, or faulty healing may have resulted in the formation of a pocket. If the cause cannot be determined without it, resort to ether will be entirely justifiable, as an active infection in the wound is certain to delay indefinitely, if not wholly prevent, further efforts at repair.

Prolapse of Internal Hemorrhoids or of the Mucous Membrane.—Sometimes the process of healing is seriously interfered with by the

prolapse of an internal hemorrhoid or a fold of mucous membrane into the wound. When this tendency is present it may be possible to prevent or correct it by care in the application of the dressings. It is better, however, in the case of internal hemorrhoids, to anticipate the accident by removing them at the time of the operation. This practice is objected to by some on the ground of danger of infection of the hemorrhoidal wounds, with resultant pain and protracted ulceration. Personally the author has uniformly followed the plan, divulsing the sphincter and removing the hemorrhoids as the first step of the operation, and has never observed any unpleasant consequences. When by reason of inadvertence or intentional omission this precaution is not taken, any hemorrhoid which is found to interfere with healing may be readily removed under local anesthesia.

Prolapse of mucous membrane is a rare complication and usually occurs in cases in which the internal sphincter has been severed without immediate suture or where the suturing has been unsuccessful. This condition is also easily remedied by removing the prolapsing fold under local anesthesia exactly as though it were a hemorrhoid. This complication cannot be anticipated as in the case of internal hemorrhoids, and ordinarily does not develop for some days or even weeks after the operation. It is sometimes an unsuspected cause of delayed healing and the possibility of its occurrence should always be borne in mind.

Premature and Vicious Healing.—When the postoperative dressings of fistula cases in which the open method is used are habitually entrusted to irresponsible internes and nurses, a certain amount of trouble of this kind may be expected. As already emphasized, the after-treatment is fully as important as the operation itself, and nothing can justify the surgeon's failure to give it his personal supervision.

If the sides of the incision are allowed to remain in apposition for any length of time a more or less firm union is likely to take place, particularly in the vicinity of the skin edges, thus bridging over the wound and leaving an unhealed pocket or sinus in the deeper portion. Care in placing the dressings so that the sides and edges of the wound throughout will be kept from coming into contact will prevent this unpleasant accident.

It is a good rule, also, to make sure at each dressing that the wound is open to the bottom by gently passing the probe or finger along the course of the incision and breaking up any adhesions which may have formed. A further precaution should be taken at the time of the operation by trimming away the skin edges freely, remembering that healing always proceeds more rapidly at this than at any other part of the wound.

Vicious cicatrization is usually due to the same cause, *i.e.*, neglect of the after-treatment. Deep, irregular, and tender scars may result, and in addition there is always the danger of incontinence from the ends of the severed sphincter being caught and the muscle distorted and weakened. Following very extensive operations some degree of trouble of this kind is likely to occur in spite of every precaution, but much may be done to minimize it, if the case is kept under close observation until healing is complete. Prevention is worth far more than cure with reference to this class of complications.

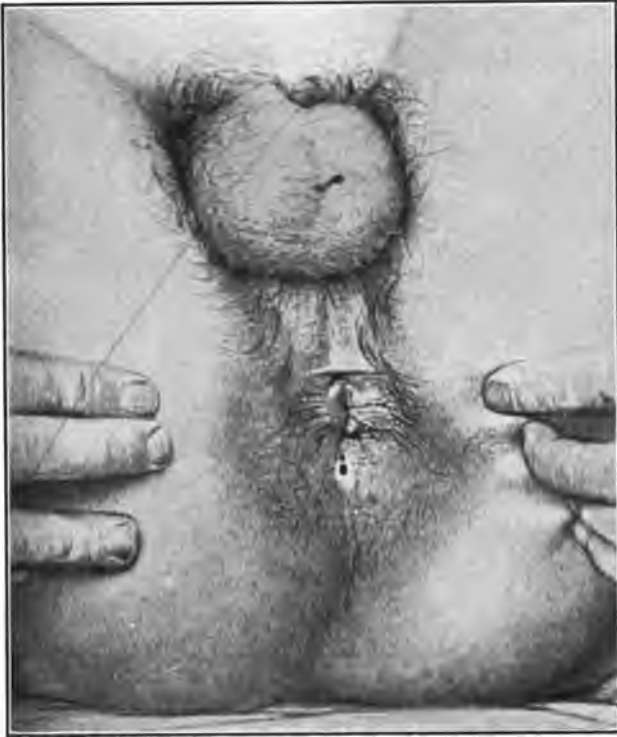
FISTULA AND TUBERCULOSIS.

The relationship between anorectal fistula and tuberculosis has long been a fruitful theme of discussion. Formerly it was maintained that the relation between the two was most intimate and important; that the development of a fistula in one threatened with or believed to be especially susceptible to pulmonary tuberculosis was to be regarded as salutary; and that the cessation of the discharge resulting from a cure of the fistula was always dangerous as likely, in some mysterious way, to precipitate the pulmonary disease. Today such views are for the most part considered both fanciful and fallacious. But the association of fistula and pulmonary tuberculosis is too often observed to be dismissed as either accidental or merely incidental. There is a relation between them in many cases which may be explained without doing violence to our modern knowledge of the two affections.

It is first necessary to understand that fistula and tuberculosis may be associated under two very different conditions: first, a fistula of the ordinary type may occur in a consumptive patient; second, the fistula itself may be tuberculous and the patient in whom it occurs may or may not be at the same time the subject of the pulmonary disease. The difference between the two classes may be succinctly emphasized by designating the former *Fistula in the Tuberculous*, and the latter *Tuberculous Fistula*.

Fistula in the Tuberculous.—The number of patients afflicted with pulmonary tuberculosis who develop fistula is not large. The proportion varies from less than 1 to 4 per cent., according to the source from which the statistics are gathered. In these cases, therefore, the fistula may be regarded as in a sense merely a coincidence, bearing no essential relation to the pulmonary disease. The lowered resistance of the consumptive, together with the loss of protecting fat from about the terminal portion of the bowel, cough, and disordered alimentary function, are sufficiently explanatory of any increased susceptibility

PLATE XII.



Tuberculous fistula.

to local infections. And, while for the same reasons a perirectal abscess is much more difficult to manage, it should always receive prompt and active treatment because of the danger of secondary infection with tubercle bacilli, either through the medium of swallowed sputum or through the lymph- and blood- channels.

In this connection it should be pointed out that, though the proportion of consumptive patients in whom fistula occurs probably averages not more than 2 per cent., the proportion of fistula cases in which phthisis pulmonalis is found to be an associate condition is much larger. Here 10 per cent. is doubtless a conservative estimate. The reason for this apparent discrepancy is that a patient seeking treatment for his pulmonary malady is very apt, intentionally or from inadvertence, to omit any reference to his fistula, and the physician consulted seldom directs an inquiry to that subject. On the other hand, when treatment is sought for a fistula, the patient's general appearance, the presence of cough and emaciation, and the sound of the voice will at once suggest the coexistence of the lung disease. In fact at the present time, whether his suspicions are awakened or not, no well-informed physician considers his examination of a fistulous patient complete until the condition of the lungs has been carefully determined.

Tuberculous Fistula.—By tuberculous fistula is meant that special variety of the disease which is characterized by the local action of tubercle bacilli. The trouble may be primary, or secondary to a pulmonary or other tuberculous process. In the former a local abrasion or contusion is very probably the most frequent exciting cause, the organisms reaching the part either directly from the skin surface, or through the medium of ingested food. In the latter, the infection in most instances is doubtless derived from bacilli swallowed in the sputum, though the possibility of conveyance by the blood-current is conceded by pathologists. The view formerly held, that tubercle bacilli were unable to resist the action of the acid gastric juice, is no longer accepted; but that it does constitute a powerful natural protection is evident, else the cases of localized infections of the intestinal tract, tubercular peritonitis, etc., would be far more numerous.

A typical tuberculous fistula is readily recognized by its appearance (Plate XII). The large, excavated external opening, with livid, undermined edges; the thin, milky-looking discharges; the absence of tenderness and induration, etc., are features not easy to mistake. The internal opening is uniformly much larger than in simple cases, often being of sufficient size to admit the tip of the examining finger. In patients who are also the subjects of pulmonary tuberculosis the

general emaciation manifests itself in the perineal region in undue prominence of the tuberosities, with apparent retraction of the anus, and an excessive growth of fine, silky hairs is frequently to be noted.

But, however unmistakable the diagnosis may seem, the corroborative testimony of the microscope should be sought in every case of fistula. This is particularly important where the clinical evidences point to a simple infection. The routine use of the microscope would certainly reveal the presence of tubercle bacilli in many unsuspected cases, thus making it possible to more fully safeguard the patient's interests. The specimen for microscopic examination should invariably be obtained by gently curetting the sinus or cavity, since the presence of the bacilli in the discharge is accidental and their absence of little diagnostic value. Of course the treatment of no case should be undertaken until the patient as well as his fistula has been submitted to a thorough, painstaking examination.

Treatment.—The question of treatment presents several most important phases: First. Will the general health of the patient be impaired by curing the fistula? Second. What is the best and safest method of treatment in these cases?

It is the consensus of opinion of modern authorities that where the fistula is of a simple character operation should be undertaken, provided it can be performed without too great risk from the anesthetic, etc., the wholly reasonable idea being that the patient's chances of recovery from his lung disease will be improved if he can be relieved of the exhausting rectal complication.

On the other hand, when the fistula is itself tuberculous, whether pulmonary tuberculosis coexists or not, the propriety of operation is by no means so self-evident. The majority of surgeons teach that, with the proper precautions as to technique, operation is usually justifiable. Tuttle,² however, sounds a distinct note of warning upon the subject, stating that he has seen 5 cases in which tuberculosis either of the lungs or of the peritoneum rapidly followed operations for tuberculous fistulas. While he stands practically alone in this attitude, his experience emphasizes the need of extreme caution in handling this class of cases. When the method of open incision is employed there is always the danger of a large, indolent, non-healing wound resulting, which, even if no secondary infection follows, will certainly be small improvement upon the original condition. I have never met with a disaster of the kind recorded by Tuttle, but do not question the possibility of such an occurrence.

² *Op. cit.*, p. 376.

The best and safest method of treatment cannot be laid down in the form of a general rule, but must be determined for each individual patient after carefully studying every aspect of the case. Ordinarily, it may be said that in the case of simple fistula occurring in a tuberculous subject the radical operation should be performed, if the pulmonary condition does not forbid the administration of a general anesthetic. Chloroform is much less irritant to the air passages than ether and, unless positively contraindicated, is always to be preferred under these circumstances. Certain cases may be successfully operated upon under local anesthesia, which should invariably be the practice when possible. Others will be suitable for the employment of the elastic ligature, which here finds its special field of usefulness. In still other cases the advanced stage of the pulmonary disease will preclude the possibility of attempting anything more than to promote the comfort of the patients by providing for free drainage and maintaining local cleanliness.

Whatever method is resorted to, one of the most important considerations is that the patient be not confined to bed for a longer time than is absolutely necessary. Fresh air, out-of-door life, and forced feeding are items of more vital moment to these patients than early operative recovery.

When a tuberculous fistula is to be dealt with, the proper method of procedure will depend largely upon the existence or non-existence of the pulmonary complication. If the latter is present, it constitutes by far the more important of the two conditions and in most cases operative measures should be restricted to those designed to relieve pain and promote drainage. If, however, the pulmonary disease is absent or is found to be in a very early stage, radical operation upon the fistula should be undertaken.

The technique of the radical operation in tuberculous fistula differs materially from that in simple cases. The ordinary open operation with incision and curettment of the walls of the sinus is to be unqualifiedly condemned as destroying the barrier erected by nature to guard the patient against dissemination of the infection. Where the conditions render it feasible to employ the method of dissection and immediate suture, it has obvious advantages. But as a rule a less ideal method will have to be followed, and the method by open incision, modified in certain important features, must remain the chief dependence.

The great danger in operating in this special class of cases consists in doing too much rather than too little. When the first incision is made, for which the cautery knife is highly desirable, it should be

planned so as to expose the tract throughout, if possible, and the knife laid aside. The main indication will then be to destroy the tubercle bacilli. For this purpose 95 per cent. carbolic acid freely applied and followed by alcohol is probably the best agent. The application may be repeated several times during the first week, cocaine being first used to render it bearable. Other strong antiseptics, such as bichloride of mercury (1:500), formalin solution (1:100), tincture of iodine, lysol, creolin, etc., may be employed; but the carbolic acid seems to have proved the most dependable when used as above specified.

The after-treatment consists of antiseptic irrigations and dressings, and close attention to the general health. Tonics, nutritious food, and an abundance of fresh air are urgent indications from the outset, and the patient should be encouraged to leave his bed at the earliest possible moment. Ordinarily the wound will be found to heal as kindly, and often as rapidly, as in simple non-tuberculous cases.

PLATE XIII.



Prolapsed internal hemorrhoids.

CHAPTER XIII.

Hemorrhoids (Piles).

ETIOLOGY—CLASSIFICATION.

THE early history of this disease constitutes one of the most interesting chapters of medical literature. Introduced to us under the name of "*emerods*" by Moses and the prophet Samuel away back in the remoteness of sacred antiquity, its position among human ailments is both conspicuous and unique. The first recorded reference to it is found in the fifth book of the Old Testament, where it appears among the long list of curses for disobedience with which the children of Israel were threatened: "The Lord will smite thee with the botch of Egypt, and with the *emerods*, and with the scab, and with the itch, whereof thou canst not be healed."¹ Three centuries later the disease appears for the first time as an actual condition under the strange guise of a plague or curse visited upon the Philistines for having taken the ark of the covenant. In order to rid themselves of their affliction, we are told, the Philistines were instructed by their priests and diviners to return the ark to the children of Israel, sending with it as a trespass offering golden images of their "*emerods*." The student of the subject will find entertainment, if not instruction, in reading I Samuel, v and vi.

The subsequent seven or eight centuries are a blank so far as concerns the history of the disease, and not until the advent of Hippocrates do we find it assuming a definite place in nosology. From this time on practically every medical author among the ancients wrote upon the subject; and, following the teachings of their illustrious master, the same fantastic views and grotesque theories gravely stated mark the writings of all.

For many centuries the very nature of the disease was wholly misunderstood. The Father of Medicine himself regarded hemorrhoids as "a defluxion of pituitous matter to the veins of the anus" whereby was evacuated the black bile or melancholic humor, thus assigning to them an important office in the regulation of the vital functions. Most of the ancient writers subscribed to this view. And even the nineteenth century, with all its boasted enlightenment, did not fail to produce advo-

¹ Deuteronomy, xxviii, 27.

cates of vagaries almost as absurd. Only a little more than seven decades ago the celebrated French writer, M. Trousseau, taught that the bleeding from hemorrhoids always served a salutary purpose in the economy, and recommended that suppositories of tartar emetic or cupping glasses be employed to reproduce it when "suppressed."²

Definition.—The term *hemorrhoids* is from the two Greek words *αἷμα*, blood, and *ῥόος*, flow, meaning literally a flow of blood. The derivation of the word indicates that it was originally applied because of an inconstant, though, when present, conspicuous, symptom. And gradually, without regard to the pathology involved, or rather in ignorance of it, this symptom of hemorrhage came to signify the disease itself. The term is an unfortunate one and in the past has been the cause of much confusion, references to hemorrhoids of the nose, mouth, uterus, etc., being not at all infrequent. At the present time by common consent its use is restricted to the rectal condition and, in spite of etymological defects, it would be both difficult and unwise to displace it.

The term *pile*, from the Latin word *pila*, signifying a *ball* or *swelling*, is a much more accurately descriptive designation. Because of its greater simplicity this is the designation employed in vernacular speech and for this reason, probably, it has come to be regarded as in some sense vulgar. "Piles"—"itching," "blind," "bleeding," or "protruding"—is a very common and familiar malady; comparatively speaking, few are troubled with "hemorrhoids." From a scientific standpoint there is no reason for discrimination between the two terms, and they will here be used synonymously.

As above intimated, there was formerly much confusion as to the true nature of the disease. It is now generally recognized as a pathologic condition involving primarily the blood-vessels about the termination of the bowel. When Bodenhamer employed the term "hemorrhoidal disease," he adopted the most appropriate designation the affection has ever received.

Neither hemorrhage nor organized tumors are an essential feature. The former is merely a symptom, inconstant and accidental; the tumors, when present, are of late development and in a certain sense may be properly considered as sequelæ. The disease itself is something other and more, embracing factors antecedent to such local expression.

It is true, however, that the disease is seldom recognized until one or the other of these phenomena has appeared, usually the tumors. A simple and correct clinical definition, therefore, would be: *Hemorrhoids*

² Wm. Bodenhamer: "A Treatise on the Hemorrhoidal Disease" (Wm. Wood & Co., 1884), pp. 136 and 137. This monumental work will well repay a careful reading.

or piles are tumors originating in a pathologic condition of the hemorrhoidal blood-vessels.

ETIOLOGY.

In this affection a correct idea of the blood-supply of the parts involved is absolutely essential to a clear understanding of its etiology. The movable rectum is supplied almost exclusively by the superior hemorrhoidal artery, the terminal branch of the inferior mesenteric, while the anal canal and contiguous structures receive their blood from the middle and inferior hemorrhoids, branches direct and secondary respectively of the internal iliac. A closely analogous arrangement prevails with respect to the vessels returning the blood. The veins of the movable rectum first ascend in the submucosa and, penetrating the muscular coat about three inches above the anus, converge between the muscular and serous coats to form the inferior mesenteric vein, which unites with the splenic vein almost at right angles to form one of the main branches of the portal vein. The blood from the area supplied by the middle and inferior hemorrhoidal arteries is returned through veins of the same names directly into the general circulation by way of the internal iliac veins. Considerable significance attaches to the fact that the former set of vessels, like all the tributaries of the portal system, is destitute of valves.

The causes of hemorrhoids are divided into two classes, predisposing and exciting.

Predisposing Causes.—Since hemorrhoids is a malady peculiar to the human family, it is evident that the upright carriage of man may be considered as an important predisposing cause. With respect to this portion of the body the average man maintains the erect attitude for approximately two-thirds of the twenty-four hours, and during this time the weight of the superimposed columns of blood is necessarily supported to a greater or less degree by the venous plexuses at the distal extremity of the bowel. In consequence, during the larger portion of each day, these vessels are normally distended and the parts in a condition at least approaching congestion. The looseness of the mucous membrane, and the abundance of the cellular tissue in which the blood-vessels of the region ramify, are also items of practical bearing in this connection. Thus it is apparent that the great underlying cause of hemorrhoids is to be found in the erect posture of man and the anatomic structure and conformation of the parts.

However brought about, (*a*) *congestion* must be recognized as the primary or basal factor in the production of this disease. This state, in addition to the purely anatomic points already noted as favoring it,

may arise as the expression of physiologic as well as pathologic causes. Anything that prevents the portal vein from emptying itself freely into the liver must result in damming back the column of blood into each of its several radicles, thus producing engorgement and congestion of their distal extremities. No other organ is so frequently subject to this condition. Indeed, it may be properly regarded a normal condition at certain regularly recurring intervals; for after every meal and during the continuance of the digestive process the contents of the portal vein and its tributaries are enormously increased, and both the liver and spleen are temporarily in a state of physiologic congestion.

In a pathologic sense also this condition is by no means infrequently observed. Among all human ailments none is more widely prevalent than that popularly known as biliousness or torpid liver, now generally understood to be in the majority of instances the result of autointoxication. From clinical observation we know that at such times hemorrhoids are especially apt to develop or, if already present, are likely to undergo acute exacerbation. Closely associated with this particular condition are those agencies which tend to its production,—improper diet, indolent habit, sedentary life,—in short, violation of hygienic law. The gourmand and the sluggard are numerically conspicuous among the victims of this disease.

(b) *Heredity*.—It is impossible to accurately estimate the influence of heredity in the causation of a disease as widely prevalent as hemorrhoids. The idea that it is hereditary in many instances has not lacked for able advocates. But viewing the question in the abstract, it would be strange indeed if an affection as common as this were not frequently observed in succeeding generations of the same family, especially when the business pursuits, habits of life and general environments of father and son are so apt to remain identical. Strict regard for the truth would seem to warrant no stronger claim than that, with respect to this as to numerous other bodily ailments, a certain predisposition or vulnerability is apparently sometimes inherited.

(c) *Race*.—Of itself, aside from the mode of life which distinguishes it, race probably plays no part in the matter of susceptibility to the disease. Van Buren³ states that hemorrhoids was an unknown affection among the North American Indians. More recent observations, however, fail to bear out this claim. The stolid character of the Indian and his stoical indifference to physical discomfort would account in some degree for the small number of cases reported; but there is no sound reason for believing that this particular race has enjoyed a greater immunity than any other savage people.

³ "Lectures upon Diseases of the Rectum," 2d ed., p. 12.

(d) *Climate and Season*.—Proportionately the smallest number of cases are found in mild or temperate climates. Equable temperature, with no necessity for marked alteration in diet, dress, and mode of living, accounts for this fact. In torrid climates a general relaxation of the system prevails, together with a tendency to diarrheal affections and to certain special diseases involving derangement of the liver. In very cold regions, on the other hand, the diet is apt to be of a concentrated character, thus favoring constipation, and the bulk of the clothing required and the inconvenience and discomfort of removing it in cold weather cause the act of defecation to be postponed or unduly hastened, thus also leading to constipation and straining.

With reference to *season*, the ancients believed that the disease was much more prevalent in the spring of the year when a north wind blew. Doubtless the effects attributed to season are better explained by the weather and the consequent variations in dress, diet, and habit, as noted in the previous paragraph.

(e) *Diet and Habit*.—Those who frequently indulge in the excesses of the table are especially prone to hemorrhoids. This applies both to the kind and quantity of the viands consumed. Overeating, particularly of rich and highly seasoned foods, and the use of alcoholic beverages, alike conduce to hepatic engorgement, constipation, intestinal toxemia, etc. In certain individuals indulgence in special articles of diet, *e.g.*, shellfish, has been observed to provoke acute “attacks of piles” as often as partaken of. In such cases the diet is properly classed as an exciting cause.

Likewise those of sedentary habit and indolent disposition are peculiarly susceptible to the disease. The several functions of alimentation require a certain amount of bodily exercise for their healthy performance, and the act of defecation cannot be neglected with impunity. As stated under (a) *congestion*, violation of hygienic law is conspicuous among the predisposing causes of this disease.

(f) *Age*.—Hemorrhoids may be considered as distinctively an affection of the middle period of life. Few cases are encountered before puberty and they are equally rare in those of advanced years. Middle age, then, may be regarded as a predisposing cause in the sense that both extremes of life are comparatively exempt.

(g) *Sex*.—Considerable diversity of opinion has always existed as to the relative frequency with which hemorrhoids occur in the two sexes. *A priori*, there are plausible and cogent reasons why each sex should be more susceptible than the other. Thus, the predisposing factors of pregnancy, parturition and the climacteric, style of dress, inactive life, etc., in women are offset by the greater prevalence of intemperance in

eating and drinking, excessive venery, violent muscular exertion, and the straining incident to urethral, prostatic, and vesical disease in men.

But, whatever may be the true proportion with reference to its occurrence, there can be no doubt that the disease is much more frequently encountered clinically among males than among females. In explanation of this fact it need only be pointed out that the native modesty of woman and her familiarity with hemorrhage from a neighboring organ lead her to bear in silence what would impel the average man to seek medical advice without delay. Goodsall and Miles⁴ give the following statistics: Of 104 cases of external piles 82.7 per cent. occurred in men and 17.3 per cent. in women; of 797 cases of internal piles 73 per cent. occurred in men and 27 per cent. in women.

(h) *Avocation*.—Either too little or too vigorous physical exercise may predispose to hemorrhoids. Bookkeepers, bank clerks, and others who spend the greater portion of their time sitting or standing in the erect posture, with insufficient out-of-door life and bodily activity, are prone to the disease. The same is true of the wealthy classes, in which natural indolence and lack of incentive are apt to conspire to a sedentary manner of existence.

On the other hand, those who follow occupations which require heavy lifting and prolonged muscular exertion of any kind are frequently the subjects of hemorrhoids, particularly the external variety. Railway operatives who are much on their feet, subject to the constant jarring of the trains, and whose habits are necessarily irregular, are said to be especially liable to develop this as well as other rectal ailments.

(i) *Temperament* can hardly be considered a cause of hemorrhoids, but is rather the expression of those personal characteristics which serve to establish individuality and with certain of which hemorrhoids are likely to be associated. The melancholic disposition, sallow complexion, and irascible temper which distinguish the so-called bilious temperament are most often found in those who suffer from chronic derangement of the liver function, which is itself recognized as one of the most potent predisposing causes of the disease.

Exciting Causes.—A number of the factors mentioned under the several headings of predisposing causes oftentimes may be more properly classed as exciting causes. To avoid confusion these will again be briefly referred to in the present connection.

(a) *Constipation and the Act of Defecation* stand first in importance among the exciting causes. The passage of costive stools always requires strong muscular effort and takes place in a direction opposite

⁴ "Diseases of the Anus and Rectum," part i, pp. 254 and 271.

to the return blood current. The sequence is largely a mechanical one. The fecal mass fills the lumen of the rectum, compressing the vessel walls so as to obstruct the circulation, and as it descends in defecation forces the contents of the veins before it with sufficient violence to cause extreme dilatation of their subjacent portions, sometimes even rupture. The natural result is a varicose condition with multiplication of the capillaries and increase of the connective tissue about the distal extremity of the movable rectum, as the irritation is from time to time repeated. When such a process is once started, the voidance of every costive stool necessarily further irritates the swollen and congested tissues, and the formation of the pile tumors is the ultimate and logical outcome.

Thrombotic external hemorrhoids are also often the direct result of the passage of costive stools, the great straining causing the rupture of a small vessel at the anal verge, with the immediate appearance of a circumscribed swelling, due to clotting of the escaped blood.

(b) *Straining at Stool*.—While the straining incident to the voidance of costive stools is the kind most likely to result in hemorrhoids because of the mechanical action of the fecal mass, straining at stool from any cause operates to the same end. When the powerful abdominal muscles contract, particularly in the posture for defecation, the force is applied downward and backward toward the promontory of the sacrum, the intestines being crowded into the pelvis and compressing the rectum against the posterior bony wall. As a result of this pressure the vessels of the rectum are greatly distended and, if it is long continued or often repeated, a varicose condition naturally follows, thus laying the foundation for the development of hemorrhoidal tumors.

Aside from constipation, proctitis and stricture of the rectum are perhaps the two most frequent causes of straining, though it must not be forgotten that urethral stricture, stone in the bladder, retrodisplacements of the uterus, and other pelvic diseases sometimes seem to produce a similar effect.

Straining also often results from the haste with which the act of defecation is attended to by the thoughtless and those whom a lack of time compels to disregard hygienic considerations.

Paradoxically, too prolonged sitting at stool conduces to the same result, *i.e.*, venous congestion, because in this posture the vessels are deprived of their normal support. Attractive toilet rooms and the morning newspaper encourage this evil in modern city life, especially among those for whom time exists only to be disposed of.

(c) *Other Diseases of the Rectum*.—Tenesmus and straining are the familiar phenomena of a number of different pathologic conditions. Acute proctitis, either alone or associated with other local diseases, is

the most frequent cause of tenesmus, which is always a symptom of inflammation of the rectal mucosa and invariably manifests itself in straining. Congestion is of course an inseparable accompaniment of inflammation, and straining is the means by which an otherwise transient and passive condition is transformed into definite and permanent pathology.

The straining due to stricture of the rectum is increased by the mechanical factor of partial obstruction of the bowel lumen. The venous circulation is usually also greatly impeded at the site of the stenosis by the encroachment of the fibrous deposit upon the vessel walls, and a condition of active congestion is thus established. But, while hemorrhoids are a frequent complication of stricture, the primary pathology is of such overshadowing importance that they properly receive only incidental attention.

(d) *Diseases of Other Organs.*—Reference has already been made to the fact that straining, one of the most potent of the exciting causes of hemorrhoids, may be occasioned by certain pelvic diseases located outside of the rectum. Congestion produced and maintained by diseases of other organs is also an important etiologic factor. Interference with the rectal circulation by the pressure of abdominal and pelvic neoplasms often seems to be directly responsible for the development of the disease. Cirrhosis of the liver and valvular lesions of the heart operate to the same end through obstruction of the portal circulation. It was long ago noted that in these conditions free loss of blood from the rectum afforded marked relief, the explanation given being that in this way the offending "atrabile" found escape. Modern pathology confirms the old theory that in certain cases hemorrhoids may be salutary.

Certain acute affections of the lungs and kidneys also occasionally seem to be provocative of hemorrhoids, though explanation of the relationship is by no means so obvious.

The frequent association of hemorrhoids with certain chronic lesions of the spinal cord is more readily understood. Here interference with normal peristalsis, over which the cord presides, results in constipation and the rectal pathology is the indirect consequence. Paraplegia and the late stages of posterior sclerosis are the special conditions in which hemorrhoids are most likely to be encountered.

(e) *Purgatives and Other Drugs.*—The habitual use of purgative medicines is one of the most noteworthy of the exciting causes. The agents of this class uniformly act as irritants to the intestinal mucosa, certain of them seeming to expend their chief effect upon the colon and rectum. Congestion results both from the local irritation and from the violent peristalsis and straining excited. Furthermore, as is

well recognized, their after-effect is uniformly to encourage and establish the very condition for which relief was sought, thus leading to chronic constipation.

Such irritant drugs as colocynth, jalap, podophyllum, aloes, etc., form the basis of most of the patent purgatives which are so widely advertised in the secular press and the consumption of which is so enormous. Their use once begun, they rapidly become more and more necessary, which is, of course, the very end aimed at by the manufacturer-advertisers. There is no doubt that hemorrhoids as well as other rectal diseases are the products of this pernicious habit to a larger degree than is generally appreciated.

Certain other kinds of drugs are also capable of acting as exciting cause. Most notable of these are the several agents classed as emmenagogues, *e.g.*, ergot, cantharides, and oil of savin, all of which cause marked congestion of the pelvic vessels and more or less active peristalsis. Happily their use is comparatively rare.

(f) *Certain Articles of Diet.*—The predisposing influence of diet in general has heretofore been referred to. That certain articles of food may exert a direct exciting effect, particularly in those with a tendency to the disease, is well established. Radishes, onions, excessive quantities of "mellow" cheese, mustard, pepper, spices and other condiments, and rich and highly seasoned dishes of all kinds, may act in this way. In addition certain people appear to possess an idiosyncrasy for some special article of food or drink. Thus, one person cannot indulge in any quantity of strawberries without suffering from an attack of piles; another cannot eat shellfish without a similar result; still another cannot partake of particular varieties of wine. In all such cases it is probable that the hemorrhoidal trouble is secondary either to acute indigestion and diarrhea or to derangement of the hepatic function; but the connection often seems direct enough to justify comment.

(g) *Pregnancy and Parturition.*—It is probable that few women pass through the pregnant state without suffering to a greater or less extent from hemorrhoids. Ready explanation of this is to be found in the mechanical obstruction of the pelvic circulation incident to the condition.

The terrific muscular straining which accompanies parturition is of course an even more powerful exciting cause. In the author's experience treatment for hemorrhoids has comparatively seldom been sought by nulliparous women, and in the large majority of cases occurring among women the patients were able to trace the beginning of their trouble very definitely to the ordeal of maternity.

(h) *Tight Lacing*.—The list of exciting causes would not be complete without reference to tight lacing. Undoubtedly this is a positive cause of hemorrhoids as well as other pelvic diseases, when carried to the extreme which sometimes demands of its devotees the sacrifice of sanity to style. Displacement of the viscera and interference with the circulation are the obvious means by which the evil is produced.

Among the many other causes of hemorrhoids,—some altogether fanciful, others with a more or less apparent show of reason,—which have been described and emphasized in the literature of the subject, may be mentioned spasmodic contraction of the sphincter, the habitual use of warm enemas, excessive venery, and emotional excitement.

Without further enumeration or discussion of etiologic factors it may be observed in this connection that cases are often met with in which it is absolutely impossible to trace the disease to any definite cause or causes. Piles are a universal possession, manifesting certain aristocratic preferences, it may be, but peculiar to no class of people and in no sense a respecter of persons. Rich and poor, male and female, active and sedentary, are alike subject to them. And so common is the malady in one form or another that the individual who lives through middle age without making its personal acquaintance, may well esteem himself an especially favored mortal.

CLASSIFICATION.

If popular nomenclature were consulted, it would be necessary to adopt an extensive and complicated scheme of classification. The terms bleeding, itching, protruding, etc., ordinarily employed by the laity because of the fancied importance of some special symptom, are both confusing and without scientific value. Clinically there are only two classes of hemorrhoids, *external and internal*, though several varieties of each class are recognized. This division is in strict accordance both with the embryology and the anatomy of the parts. The portion of the anal canal below the mucocutaneous line is developed from the ectoderm, the portion above in common with the rectum proper from the endoderm, and the continuity of the canal is not established until late in fetal life. This developmental distinction is exhibited permanently in the different vascular and nerve supplies and other anatomic characteristics of the two portions.

It is of the utmost importance that the two forms of the disease be clearly differentiated. Closely related in their origin and mode of development, their clinical features are wholly dissimilar and their proper treatment radically different.

External hemorrhoids are situated below or upon the distal side of the mucocutaneous line; covered by the skin or skin and mucocutaneous tissue of the anus; involve the vessels of the inferior venous plexus, which is connected with the general systemic circulation, and are fixed in their position outside of the external sphincter muscle.

Internal hemorrhoids are located above or upon the proximal side of the mucocutaneous line; invested wholly by mucous membrane; implicate only the veins of the superior hemorrhoidal plexus, which is connected with the portal system, and when accidentally prolapsed are capable of being returned to their normal habitat within the rectum.

A third variety, known variously as *externointernal*, *internocexternal*, or *mixed hemorrhoids*, is merely a combination of the other two, and has the physical characteristics of both. This variety is most likely to be seen in cases of long standing in which a coalescence of an internal and external tumor has occurred, so that the two are blended into one inseparable mass. The treatment of this form of the affection is for the most part identical with that of the internal variety, with which it will be considered.

CHAPTER XIV.

External Piles.

MANY varieties of external piles have been described and no little confusion has resulted from the efforts to differentiate between them. Strictly speaking, there are only two distinct varieties, the *thrombotic pile* and the *connective-tissue pile*. The so-called "venous" external pile is not a pathologic entity, being merely an inconstant condition of fullness or swelling about the anus due to the unusually superficial location of the hemorrhoidal veins, which, in the absence of the complications of infection or thrombosis, gives rise to no symptoms whatever. The term "edematous pile," used by many to designate another separate variety of the disease, means nothing more than that a local inflammation is present. A "compound external pile" is simply a condition in which one or more thrombi and some degree of connective-tissue hyperplasia coexist. And so, when carefully analyzed, the several other varieties which have found a place in the literature of the subject might be explained and disposed of (Fig. 94).

THE THROMBOTIC PILE.

What is commonly known as a sudden "attack of piles" is usually of this kind. The onset of the trouble is practically always abrupt and in the majority of instances is definitely associated with straining at stool. A slight burning, or perhaps merely a sense of local uneasiness, may be recognized at the time. As the discomfort increases, the patient feels as though a foreign body were present in the grasp of the external sphincter and, following the frequent contractions of the muscle and the repeated application of pressure from without, active pain soon sets in. Examination at this time will disclose one or more tense, livid or purplish tumors, globular or ovoid in shape, varying in size from a small pea to an almond and exquisitely sensitive to the touch, located at the verge of the anus outside of the external sphincter. There is usually only one tumor, though there may be two or more. In the latter event it has been a personal observation that they are as a rule placed close together and always upon the same side of the anus. Exceptionally several clots may be found in a single tumor.

The **pathology** of this condition is quite simple. Under the increased pressure incident to straining at stool a weakened vessel gives

way and allows the blood to escape into the surrounding tissues, where it quickly clots. The ruptured point is usually so minute that the oozing takes place slowly, the size of the clot being determined to a certain extent by the amount of back pressure required to control it. The color of the resulting tumor varies with the depth from the surface at which the clot is placed; if considerable tissue intervenes, instead of being dark blue or purplish, it will present merely a bleached, glistening appearance.

The teaching that the clotting occurs within the vein is certainly a fallacy, except in rare instances. For such a thing to happen a pre-existing phlebitis must of course be assumed, and in this event the thrombosis would be only a minor incident or complication of the

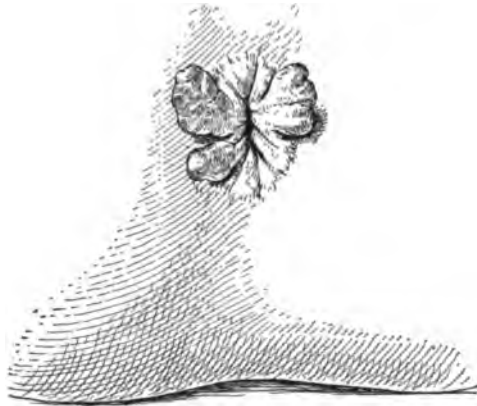


Fig. 94.—External hemorrhoids.

already present disease process. Remembering the not infrequent occurrence of suppuration about the clot, if the lumen of a vein were involved the condition would be uniformly one of grave, instead of trivial, import.

The **etiology** of the thrombotic pile is sufficiently indicated in the term straining at stool. Back of this, of course, is the costive condition which renders the straining necessary, and, still further back, the constipation of which the costive condition is an expression. It is interesting to note in this connection that the straining or tenesmus which accompanies proctitis and ulcerative lesions of the rectum is seldom the cause of a thrombotic external pile. The obvious explanation is the absence of the distention and pressure produced by the fecal mass. Any painful lesion of the anus is apt to cause spasmodic contraction and hypertrophy of the external sphincter and bring about the occasion for straining at stool. Thus, for example, a fissure may be

the indirect cause of the hemorrhoidal trouble, or it may be simply a coincidence due to the same cause. With few exceptions a thrombotic pile is an acute condition, the patient being able to speak positively as to the exact time of onset. The complications resulting from infection are not often seen, because the discomfort rapidly increases and relief is generally sought early. In neglected cases extensive edema and abscess formation may develop.

The **symptoms** of thrombotic piles are usually pronounced from the beginning. Following the initial uneasy or burning sensation, there may be a brief interval of quiescence while the clot is forming. Local irritation or tenderness rather than actual pain is first recognized. As the tension increases the pain becomes pronounced and the patient's attention is soon focused upon the part. Self-examination early leads to the discovery of a swelling, and attempts to reduce it by manipulation with the finger and by forcible contraction of the sphincter rapidly increase the tenderness and suffering.

Unless, or until, infection occurs there are no active constitutional symptoms. Disordered secretions, furred tongue, headache, etc., from voluntary postponement of defecation are probably observed in most cases. But increasing pain usually impels the patient to seek medical attention before the stage of infection and constitutional involvement is reached.

Inspection is the one requisite for **diagnosis** of the condition. The patient's description of the symptoms, mode of onset, etc., may be strongly suggestive, but accuracy of diagnosis and intelligent treatment are absolutely dependent upon the information which can only be derived from physical examination. The appearance of the small, sharply circumscribed tumor, livid or purplish in hue, located at some point of the anal verge, is so characteristic that it may usually be recognized at a glance. (Plate XIV.)

The prognosis is always good if the patient will consent at once to the proper treatment. Absorption of the clot may be expected in a certain proportion of cases without treatment of any kind; but the price of neglect may be several days or even weeks of unnecessary suffering and ultimately unavoidable surgery. In very rare instances calcification of the coagulum may take place, giving rise to what have been described as "anal concretions."

Treatment.—Given a tractable patient, the treatment of thrombotic piles advised should practically always be surgical, for the following reasons: (1) it is exceedingly simple and virtually free from danger; (2) it may be carried out painlessly under local anesthesia; (3) the after-pain, while usually sharp, is of brief duration;

PLATE XIV.



External thrombotic hemorrhoid.

(4) the loss of time is short as compared with effective non-surgical methods of treatment, and (5) the results are far more certain.

Two methods of operating are available, *incision* and *excision*. In the majority of cases the former will answer every purpose and has the advantage of much greater simplicity. Excision is indicated when the tumefaction of tissue is so considerable that mere evacuation of the clot would result in a permanent skin-tag, thus rendering cleansing of the parts difficult and inviting future attacks. This indication is

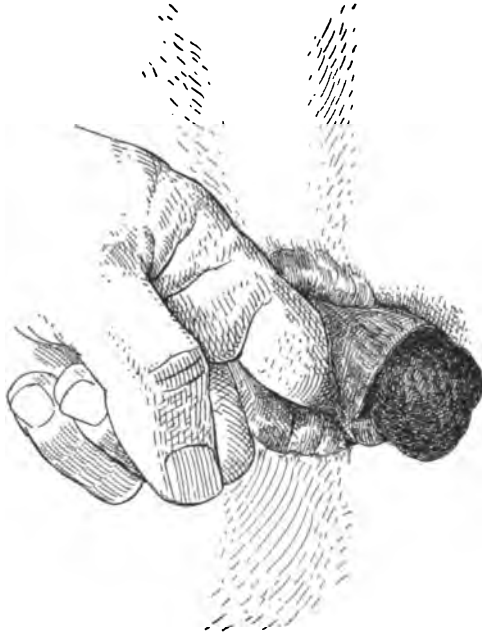


Fig. 95.—Treatment by incision. Clot extended.

most likely to be present in long-standing cases or those in which there has been a previous occurrence of the trouble at the same site.

The technique of the operation by *incision* is as follows: The best exposure of the part is obtained by placing the patient in the lateral position upon the same side as the tumor to be incised, with the limbs well drawn up. After carefully cleansing the field a small, fine-pointed hypodermic needle is entered at the most prominent part of the tumor and the anesthetic solution slowly injected as the position of the needle is changed. The amount of the solution required will depend upon the size of the pile; ordinarily 5 to 8 minims will be

sufficient. A 1 per cent. solution of cocaine or novocaine will give perfectly satisfactory results. The finger of the left hand is then lubricated and gently introduced into the rectum so as to steady the tumor and render it more prominent, and a thin, sharp-pointed curved bistoury quickly passed through it in a direction transverse to the anal margin. The clot will usually slip out at once (Fig. 95). If it should not, a little pressure with the finger will suffice, or the delicate tissue overlying it may be grasped with the forceps and the clot in its adventitious envelope rapidly dissected out with the scissors. The cavity occupied by the clot is filled with sterile gauze and the edges of the incision held apart by the same means. The wound is then dressed with a soothing antiseptic ointment and a compress and T-bandage applied. The gauze packing doubtless adds somewhat to the after-pain, but in the long run saves trouble, as, if omitted, the clot is very apt to re-form and the oozing is often quite free; it seldom requires renewing. Suturing of the incision is not advisable. A few hours in the recumbent position will promote the patient's comfort and hasten recovery. The bowels should be moved in twenty-four hours and fresh dressings applied. Relief is generally complete after the first day and the wound entirely healed within a week.

When the method by *excision* is determined upon, the needle is entered through the skin at the base of the tumor and the area underlying it thoroughly infiltrated with the anesthetic solution. After a few moments' delay in order to allow the full effect to take place, the pile is seized with the forceps, slightly lifted out from its attachment and rapidly removed with curved scissors (Fig. 96). Any bleeding points are then caught and twisted, or ligated with fine catgut. The wound may be left to heal by granulation or, if the operator prefers, closed with a continuous suture of small-sized gut. In spite of the prejudice existing against the use of sutures in this locality, the latter plan has decided advantages and is well worthy of trial in suitable cases. Should primary union fail, the sutures may be readily removed and the wound treated as though open from the beginning, with little or no loss of time to the patient. Scrupulous antisepsis will do much to insure the success of this method. The author has employed it repeatedly with entire satisfaction.

The non-surgical treatment of thrombotic piles calls for only the briefest mention. Occasionally no explanation or urging will avail to overcome the patient's dread of even a trivial operation. For such cases the best that can be done is to advise rest and astringent applications with the hope that infection may be escaped, and the clot absorbed. The use of the ice-bag is sometimes effective in allaying inflammation, but

continuous application of a lead-water and laudanum lotion or an ointment of similar composition is more generally dependable. It is probable that the majority of cases so treated go on to suppuration and surgery finally becomes necessary. Under the most favorable circum-

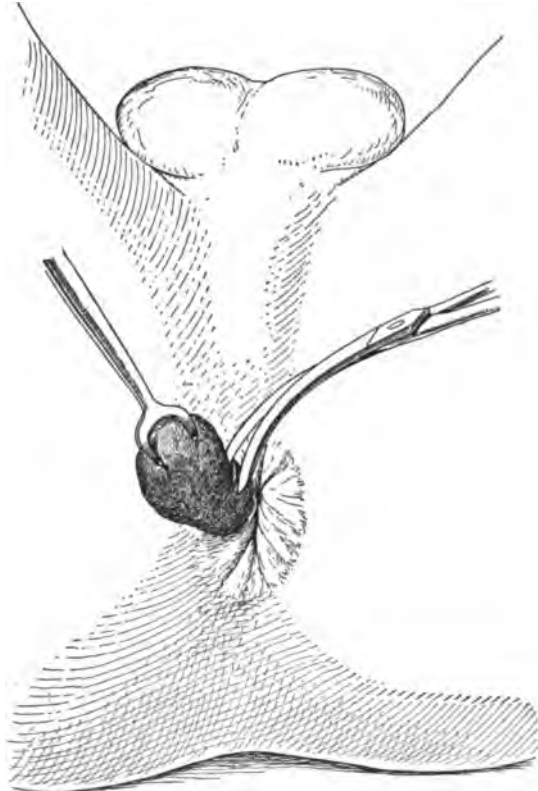


Fig. 96.—Treatment by excision, showing forceps and scissors.

stances the time required for relief and the aggregate of discomfort endured are far greater than when early operation is resorted to.

CONNECTIVE-TISSUE PILES.

This form of external piles is described under a variety of names by different writers, *e.g.*, cutaneous piles, edematous piles, inflammatory piles, hypertrophied skin-tags, etc. Inasmuch as connective tissue is always the predominant element in these tumors, the title here employed seems the most accurate and appropriate.

A certain amount of redundancy of the anal folds appears to be a normal condition in many people. In these instances the application of the term pile, as implying a pathologic process or sequence, would be a misnomer. Youths and even children have been observed with such a condition who have never had a symptom of any kind referable to the parts. Yet it seems altogether reasonable to assume that individuals so constructed would, as a class, form the readiest victims to this particular variety of external piles.

When quiescent a connective-tissue pile is distinguishable only by its prominence. Identical in color with the contiguous parts, non-

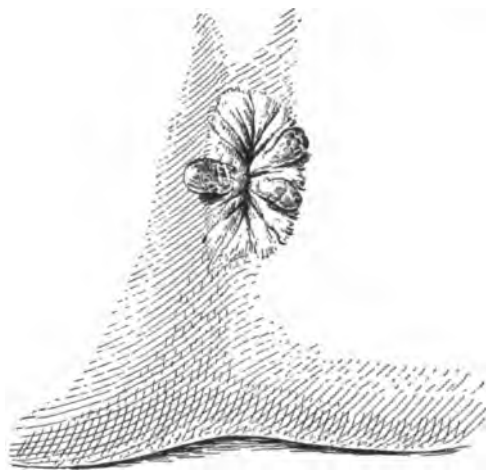


Fig. 97.—Connective-tissue variety skin-tags.

sensitive, soft, and pliable, it is in reality nothing more than a circumscribed redundancy of the anal integument. In this state the designation "skin-tag" or "skin-tab" is a peculiarly happy one (Fig. 97). There may be one or several such tags situated at any point of the anal circumference, their presence occasioning no other inconvenience than the additional care required to properly cleanse the parts after defecation. The size varies from that of a small half-pea to a teat-like projection a half-inch or more in length. The attachment as a rule is sessile, though a partially constricted base giving somewhat the appearance of a pedicle is not unusual.

When examined histologically connective-tissue piles are found to consist of an outer covering composed of perianal skin externally and mucocutaneous tissue internally, enclosing a varying amount of fibrous tissue with occasionally a little fat, and having usually a single small artery with its accompanying vein entering at the base. When not inflamed, no structure abnormal to the region can be detected, the marked

increase in the connective-tissue element being the only distinctive feature.

Etiology.—The primary and invariable etiologic factor in the production of connective-tissue hemorrhoids is inflammation. Clinically, the inflammatory process which results in the condition is observed to be due to one of three causes. Probably the most frequent of these is the thrombotic pile. Some degree of connective-tissue hyperplasia is a sequence of every attack, and it is very likely true that the majority of people who live to middle age have one or more anal tags to bear witness to their personal experiences along this line. The clot may be absorbed, but the hypertrophied connective tissue is permanent, unless the whole pile is removed by surgical means.

The second cause is local infection. This may result from direct traumatism or from any open lesion of the part. The most familiar example of this cause is the sentinel pile so often seen in association with fissure, as referred to in Chapter IX. If the fissure is cured without removing the sentinel pile, the latter remains indefinitely.

The greatest interest and importance attaches to the third cause. This is long-continued irritation of the anal tissues due to chronic pathologic discharges. The list of diseases which may offend in this way and be the indirect causes of external connective-tissue piles is a long one, including internal hemorrhoids, chronic proctitis; simple, syphilitic, and tuberculous ulceration; fibrous stricture, cancer, etc. When produced in this way a low grade of inflammation is generally constantly present and firm consistence and tenderness characterize the pile tumors. When a chronic discharge exists it is practically impossible to keep the parts clean. The tissues remain constantly moist and macerated, and the material collecting between the anal folds decomposes and becomes actively irritant.

In long-standing cases superficial cracks and erosions may form at the bottom of the radiating folds, and often an eczematous condition involving the entire vicinity develops. Pruritus is a frequent complication, the patient's efforts to obtain relief by scratching serving only to aggravate the trouble.

Certain authors maintain that this type of connective-tissue piles is distinctive of syphilitic ulceration or stricture. This is an erroneous view. It is perfectly true that they are often observed in these diseases, but it is equally true that they are often observed in connection with many other diseases. The only general conclusion which is warranted in the light of clinical facts is that the appearance of the parts in this condition points strongly to the existence of other and more serious pathology within the rectum.

The **symptoms** of connective-tissue piles vary with the degree of inflammation present. The so-called skin-tags may exist for years without giving rise to any symptoms whatever. On the contrary, when acutely inflamed, they may be so extremely painful as to incapacitate the patient. In such cases the swelling and edema may be so great that neither sitting nor standing can be tolerated by reason of the pressure resulting, and the patient perforce remains in bed.

The milder grades of inflammation are marked by tenderness and discomfort rather than actual pain. Pruritus is sometimes distressing, and in patients careless as to personal habits the secondary dermatitis may be extensive and troublesome. Superficial or marginal abscess and fistula are occasionally seen as complications in these cases.

Diagnosis of the condition may be made by the simplest of all methods,—inspection. Patients do not often seek advice for this trouble unless pain is a factor or the local discomfort is great. In either case some degree of inflammation will be present and the appearance quite characteristic. The pile tumors, instead of being flaccid, wrinkled, and of the same color as the adjacent anal tissues, will be observed to be firm, congested, and to stand out prominently. The probable significance of the local condition with reference to other diseases should, however, be constantly borne in mind and each case thoroughly investigated before treatment is instituted.

Treatment.—One of the important considerations in connection with the treatment of external piles is *not* to attempt to reduce them. Increased tenderness and inflammation are certain to follow the manipulation, and, even if forced above the sphincter, they will not remain there for the very good reason that they belong outside.

Palliative treatment is rarely indicated, because of the fact that when most successful it is not curative and, the tumors remaining, repeated recurrences of the trouble are practically inevitable.

Unless there is some positive contraindication, external connective-tissue hemorrhoids, whether existing alone or as a complication of other diseases, should be treated surgically. Even though the more serious disease be incurable, the patient's comfort will be greatly enhanced by their radical removal. Of course, when operating for other diseases anal tags should not be left to complicate convalescence and invite future trouble.

The operative treatment is greatly simplified by remembering that as regards both location and part involved the pathology is confined strictly to the surface of the body. The only apprehension one could feel in resorting to surgical treatment would be the possibility of hemorrhage. But the readiness with which hemorrhage from any surface vessels may be controlled renders such apprehension entirely groundless.

The operation to be employed consists in the excision or amputation of each pile tumor separately. This may be accomplished with only a trifling amount of pain, even in extensive cases, under local anesthesia. The technique is identical with that for the excision of thrombotic piles, previously described (page 242). The only specific point to be borne in mind is that in cases with multiple tumors care should be exercised not to cut away too much of the skin about the points of attachment for fear of undue contraction of the anus when healing is complete.

In cases which will not permit of surgical measures the effort should be directed to allaying the pain and reducing the inflammation. To this end anodyne, antiphlogistic, and astringent applications should be employed. A hot flaxseed poultice will give immediate relief in some cases, the ice-bag in others. The old-fashioned lead-water and laudanum lotion, applied warm and frequently renewed, is sometimes remarkably effective. One of the most generally useful formulas is:—

R Ac. carbolicæ ℥v.
Glycerini,
Ung. belladonnæ āā ʒij.
Ung. gallæ et opii ʒss.

Sig.: Apply on compresses and cover with warm cloth after bathing parts with hot water for ten minutes.

Another valuable ointment to be applied after bathing the parts with hot water is:—

R Cocainæ gr. v.
Morphinæ gr. x.
Ext. suprarenalis,
Glycerini āā ʒj.
Ung. stramonii q. s. ad ʒj.

When agents of this class are prescribed, special warning should be given not to introduce them into the rectum, because of their toxic properties and the danger of absorption.

Particular attention should always be given to maintaining local cleanliness and any constitutional symptoms met with appropriate measures.

It remains to be said with reference to the surgical treatment of external piles of all varieties that neither the ligature nor the clamp and cautery method is to be considered in any case. This is equally true of the injection method also. Only unfounded dread of hemorrhage could extenuate choice of the two first mentioned, nothing under heaven choice of the latter. Pain out of all proportion both as to degree and duration is certain to follow any of these procedures, in addition to other pronounced disadvantages and several very real dangers.

CHAPTER XV.

Internal Hemorrhoids.

THERE is no good reason for recognizing more than two distinct varieties of internal hemorrhoids, the *venous* and the *capillary*. When examined with reference to structure the several additional varieties described in the literature are found to be properly included under the former class, the differences between them being incidental rather than essential. And, since from the standpoints of etiology, symptomatology and treatment they may be considered identical, it seems both useless and unwise to invest the matter of classification with an unnecessary complexity.

PATHOLOGY.

Upon section a *venous* pile tumor is seen to be composed of dilated blood-vessels with a variable amount of connective tissue around and between them, the whole being contained in a covering of mucous membrane. The relative proportion of the vascular and connective-tissue elements determines the firmness and other physical characteristics of a given tumor and affords a means of estimating with considerable accuracy the length of time it has been in forming (Fig. 98).

The trouble begins as a dilatation of the venous tufts situated beneath the mucosa at the distal extremity of the movable rectum, in which the radicles of the superior hemorrhoidal vein originate. Gradually the process involves the capillaries and small veins and a varicose condition with perceptible swelling results. As the swelling becomes more prominent the pressure and irritation incident to defecation increase and a low grade of inflammation with hyperplasia is established. Some thickening of the vessel walls follows and may be pronounced in old cases; but the most marked effect is the great increase in the perivascular connective tissue. In long-standing cases the latter element may preponderate so largely that the tumors will be much more of the connective tissue than of the vascular type.

There is no proportionate increase in the arterial supply. As a usual thing each tumor is supplied by one, sometimes two, of the terminal branches of the superior hemorrhoidal artery, which shows no other change than increase in size. In large tumors supplied by a single artery it is not unusual to find this approximating the radial artery in calibre.

The bleeding from a hemorrhoidal tumor is occasionally observed to occur in jets or spurts simulating pulsations. In fact, there may be true pulsation, due to the accidental involvement of an arterial twig at the bleeding point, not to the fact that there is an abnormal proportion of arterial vessels in the structure of the tumor. The term "arterial hemorrhoid" employed by certain writers to designate as a special class those tumors in which hemorrhage of this kind occurs is based upon a misconception, as conclusively demonstrated by the fact that the removal and dissection of such a tumor reveals no appreciable departure from the ordinary type with reference to its vascular constituents.

In the early stages internal piles remain entirely within the bowel. As they increase in size the effects of the act of defecation is to lengthen their attachments and push them toward the anus, until ultimately they may be protruded at every stool. The mucous membrane investing the tumors at first becomes thicker and tougher than normal. Later, as the

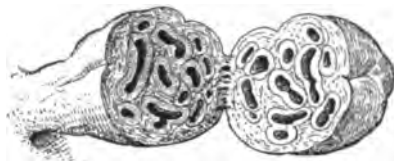


Fig. 98.—Section internal pile tumor.

friction and irritation increase, erosion or even ulceration may occur, thus furnishing the explanation of the hemorrhage which is very apt to form a chapter in the history of every case.

Coagulation of the blood in dilated venules is mentioned by some writers, organization of the clot and diminution or entire obliteration of the vessel lumens by the new-formed fibrous tissue being described as the subsequent steps of the process. This must be an extremely rare sequence of events. In prolapsed and strangulated tumors complete stasis of the circulation and active inflammation are present to account for the clotting observed. But such tumors certainly do not often escape sloughing, when not removed surgically. The author does not remember ever to have seen clots in internal hemorrhoids under any other condition.

The size of the tumors varies widely at different stages and under different conditions. The several tumors of the same case also show considerable variation in this respect. As a rule they increase progressively though not uniformly, a single tumor sometimes attaining the dimensions of a small hen-egg, while others in the same case may be no larger than a filbert. In shape they are ovoid or pyriform, this feature

being determined by the upward extension of the varicosity and the downward traction upon their attachments due to protrusion at stool. The number of tumors varies from one to six or seven. When multiple there is often a coalescence of two or more, so that, clinically, the appearance in this regard may be misleading. The line of demarcation may, however, usually be recognized.

The **capillary** hemorrhoid differs considerably from that just described. Pathologically this is a true vascular growth, being composed of a circumscribed congeries of blood-vessels lying in and immediately



Fig. 99.—Capillary hemorrhoid.

beneath the mucosa. The name “*nævoid*” is sometimes applied to it from its resemblance to an ordinary *nævus*. In shape it is oblong and plaque-like, in color bright red or purplish, in size from a small bean to an almond, in number practically always single. Its location may be the usual internal hemorrhoidal site or anywhere in the lower three inches of the movable rectum (Fig. 99).

The distinctive characteristic of a capillary hemorrhoid is the readiness with which it bleeds. The condition is a rare one and, being unattended by pain, would probably seldom be recognized were it not for this persistent tendency to bleed. As a rule the hemorrhage is not excessive, but occurs in the form of oozing, frequently or continuously, with or without known provocation.

The **externointernal** or **mixed** hemorrhoid is merely a combination of the external and internal varieties, as indicated by the name. It may be purely a coincidence, resulting from the gradual merging of two independently formed tumors; or, perhaps more usually, it may result from the extension downward of an internal tumor. Very probably an abnormally free anastomosis between the several sets of blood-vessels of



Fig. 100.—Mixed (externointernal) hemorrhoid.

the anal canal at times plays an important part in the development of this type of hemorrhoid (Fig. 100).

The pathology of a mixed hemorrhoid presents nothing distinctive. The external or distal portion is covered by the skin and mucocutaneous tissue of the anus and is composed of connective tissue; the internal or proximal portion is covered by mucous membrane and is identical structurally with the ordinary venous internal hemorrhoid.

This kind of hemorrhoidal tumor is most likely to be found in cases of long standing. More than one such tumor is not often observed in the same case. The chief interest attaching to the condition grows out

of the importance of its recognition when surgery is contemplated. It may here be said that for purposes of operation a mixed hemorrhoid is to be regarded as one of the internal variety.

SYMPTOMS.

The symptoms of internal hemorrhoids vary greatly in different persons and at different times in the same person. Such manifestations as slight pain and a show of blood will seriously disturb one individual, while another of less sensitive constitution will entirely ignore them. Many a patient has consciously carried a mass of hemorrhoidal tumors for ten, twenty, or even forty years, leading an active life and apparently maintaining the best of health and spirits all the while. Certain of such instances are accounted for by unusual personal endurance or indifference, others by the fact that the amount of discomfort incident to the condition is not a fixed quantity.

The variation in symptoms experienced by the same patient at different times is more readily explained by the accidents and complications to which the hemorrhoids are subject, and the changes in condition which they undergo in evolution.

The symptoms of internal hemorrhoids most characteristic and most constant are hemorrhage, protrusion, pain, and mucous discharge. While it cannot be said that any one of these is essential or pathognomonic, it may be positively stated that no case runs its course without some one or more of them being present.

Hemorrhage is one of the most conspicuous of the symptoms of internal hemorrhoids and, in the sense that it probably occurs at some time in the progress of every case, also one of the most constant. In vernacular speech the term "bleeding piles" is in common use, being applied indiscriminately to designate any and all affections marked by the passage of blood from the parts. Obviously it is often erroneously employed, resulting in confusion and not infrequently in disaster.

The bleeding from internal hemorrhoids may be properly regarded as an accidental phenomenon, and varies widely both as to the amount and the frequency of its occurrence. In the primary stage bleeding is rare. As the tumors increase in size they are necessarily more exposed to irritation from the fecal discharges, the amount of irritation and traumatism being determined largely by the consistence of the latter. When costive stools or scybalous masses are voided the congestion incident to straining renders the tumors more prominent and injury is easily inflicted. The loss of blood in this stage is usually slight, consisting of streaks upon the stool or a few drops following its passage.

When the tumors reach the stage of protrusion the additional factor of constriction by the sphincters becomes operative and the return circulation is partially or completely obstructed. Under these circumstances the hemorrhage may be exceedingly copious, sometimes even alarming. The bleeding generally ceases, however, with the reduction of the prolapsed tumors, though an oozing may continue with an accumulation and clotting of the blood in the rectum.

It is not at all unusual to find in old cases that hemorrhage, formerly profuse and frequent, has altogether ceased. This is accounted for in part by the relaxation of the sphincters so often seen in these cases, and in part by the thickened and leathery condition sometimes acquired by the mucosa covering the tumors.

Marvellous accounts of excessive amounts of blood lost from this source are to be found in the literature. For instance, Bodenhamer¹ refers to a case, recorded by Hoffman, of a widow, 50 years of age, who passed twenty pounds in twenty-four hours, and to another, recorded by Pezold, of a Saxon cavalier who lost sixty-four pounds in one attack, both individuals recovering. Of course such accounts, for obvious reasons, must be discredited. A little blood usually makes a big show, and the disquieting circumstances of the occasion are apt to render even a reliably approximate estimate of the quantity impossible. But it is undoubtedly true that patients have lost their lives from this cause. The author has observed many cases of acute anemia produced in this way, and several in which operation under the most unfavorable circumstances presented itself as an imperative life-saving measure.

The consequences of loss of blood from the hemorrhoidal region differ in no respect from those which follow the loss of similar amounts from other localities. It is to be remembered, however, that the bleeding from hemorrhoids is apt to be persistent, recurring from day to day, often over protracted periods of time. The resulting anemia represents the cumulative effect, and is identical in the train of symptoms it gives rise to with the same degree of anemia from other causes.

Many of the symptoms ordinarily ascribed to the loss of blood *per se* are in reality referable to associate causes and conditions. Thus the digestive disturbances may be due to reflex irritation, the back-ache likewise, and the mental depression so often observed, to long-continued pain and worry.

An important fact to be emphasized in connection with the

¹ *Op. cit.*, pp. 92 and 93.

symptom of hemorrhage is that it is not always to be regarded as an unmixed evil. On the contrary it may be most salutary in exceptional cases. Clinical observation, as well as theory, justifies the conclusion that the occasional moderate loss of blood from this source may act as a conservative process in certain conditions, notably cirrhosis of the liver and organic heart disease. The portal vein is chronically engorged in these diseases and the development of internal hemorrhoids is a frequent and natural complication. In these cases it seems clear that an occasional hemorrhage from the rectum can only serve a beneficent purpose, depleting the overloaded venous circulation and promoting the comfort, if not prolonging the lives, of the patients. The conclusion is evident that not every case of "bleeding piles" demands surgical interference.

As a rule the blood from internal hemorrhoids cannot be distinguished from that from other rectal lesions. Blood from the stomach and small intestine is much altered by the time it reaches the anus, and its approximate origin may be readily determined by inspection; but that from the various portions of the rectum and sigmoid is incapable of differentiation. It should be borne in mind that hemorrhage from the rectum does not always mean hemorrhoids.

Protrusion is the one symptom which at once and absolutely certainly establishes the diagnosis of hemorrhoids. It does not occur uniformly in every case nor early in any case. In uncomplicated cases this is often the first symptom noticed by the patient, and it is safe to say that a history of protrusion is obtained from the majority of all patients who seek relief from this malady.

In the early stages of their development, internal hemorrhoidal tumors remain entirely above the sphincter muscles. As they increase in size they are more exposed to the expulsive action of the bowel in defecation, and by degrees their attachments are elongated until they begin to make their appearance at the anal opening. At first the tumors promptly and spontaneously recede when the expulsive effort ceases. Later, reduction by the application of external pressure is necessary. In the majority of cases when the tumors are allowed to remain prolapsed for any length of time spasmodic contraction of the external sphincter is excited and strangulation with acute inflammatory swelling and intense pain supervene. If not speedily reduced under these circumstances, gangrene and sloughing of the tumors, nature's effort to effect a cure, soon follow (Fig. 101).

Certain old cases in which protrusion and reduction have been repeated daily for years, develop a condition of relaxation of the sphincters, so that the tumors prolapse upon the slightest exertion.

PLATE XV.



Prolapsed internal hemorrhoids.

In such cases merely walking or even assuming the erect attitude is sometimes sufficient to cause protrusion, and the patients must either give constant attention to their "protruding piles" or be content to lead lives of semi-invalidism.

Associated with the symptom of protrusion all the other symptoms of internal hemorrhoids are likely to be in evidence. Indeed,



Fig. 101.—Protruded internal piles with anal edema.

protrusion serves as an exciting cause of the other symptoms. Thus, hemorrhage is more likely to occur when the tumors are prolapsed because of the obstructed return circulation and because erosion of the mucosa from constant friction and manipulation is favored by the condition; pain is more likely to be a feature because of the liability to strangulation of the tumors, because of the traumatism and inflammation resulting from handling them, and because of the dragging of the tumors upon their attachments and the tendency to various

complicating lesions of the anus; and the discharge of mucus, rarely present before the stage of protrusion is reached, is occasioned by the long continued irritation and low grade of inflammation of the rectal mucosa usually associated with the condition.

Pain is a most inconstant and variable symptom of internal hemorrhoids. The term is somewhat loosely employed in this connection. If we understand it to signify only acute active local suffering confined to the parts immediately implicated, it is perfectly correct to say that pain is a rare symptom and that, when present, it is generally dependent upon some complication. If, on the other hand, the term is employed in a larger sense, to include dull aching, discomfort, uneasiness and similar abnormal sensations, whether felt locally or referred to distant parts, then it is equally correct to say that it is a very frequent symptom having a more or less prominent place in the history of practically every case.

The most usual as well as the most acutely painful complication of internal hemorrhoids is strangulation. This condition, as already explained, results from constriction of the prolapsed tumors by the sphincter muscles, and is often further complicated by edema of the anal margin due to pressure. When the tumors are reduced in time the edema promptly disappears and the active pain subsides. Necrosis involving the anal tissues, with indefinite prolongation of the suffering, may be the penalty of delay.

Fissure is another painful complication not infrequently observed. Because of the bleeding or protrusion incident to the act of defecation patients sometimes voluntarily defer it for days at a time. Costiveness, straining, traumatism, fissure, is the sequence of events which explains this complication.

In the absence of the several possible accidents or complications, active pain as a rule is not a characteristic of the affection. Instead, local discomfort, a sense of weight in the parts, irritation of the anal region by the mucous discharge, backache, reflex pains in the bladder or other organs, flatulent colic, headache from the anemia or constipation, etc., may be the symptoms complained of.

The reflex pain excited by internal hemorrhoids is naturally oftenest referred to the other pelvic viscera, *i.e.*, the prostate, bladder, ovaries and uterus. Many instances have been reported, however, in which the lumbar region, hip, or some point in the distribution of the sciatic nerve was the apparent site of the trouble, the prompt relief following correction of the rectal pathology being the occasion of no little surprise.

On the other hand it must not be forgotten that pain seemingly,

or in reality, located in the hemorrhoidal area may be caused by pathology in neighboring organs. Obviously this state of affairs is more likely to be encountered in the female because of her greater liability to diseases and abnormalities of contiguous structures. The possibility here suggested emphasizes the importance of a comprehensive examination in every case.

Mucous discharge is in no sense a distinctive symptom of internal hemorrhoids, but may be a very disagreeable one. It is most often seen in old cases in which the tumors have attained large size and relaxation of the sphincters with a tendency to frequent protrusion is present. The hypersecretion of mucus is merely an expression of the chronic catarrhal inflammation of the mucosa resulting from the friction incident to the condition; hence, strictly speaking, it is a symptom of a complication rather than of the hemorrhoidal affection itself.

Constant irritation of the perianal integument by the mucous discharge may produce a dermatitis with a most annoying pruritus. The latter phenomenon is responsible for one of the numerous popular designations of the disease, "itching piles."

Decomposition of the mucus retained about the anal region sometimes gives rise to a most offensive odor which in fastidious individuals may constitute the chief reason for seeking advice and submitting to operation.

Anemia, with its familiar chain of consequences, mental depression from pain and worry, and disordered digestion are among the more frequent constitutional symptoms observed. In exceptional cases there may be an elevation of temperature of from one to three degrees, with headache, loss of appetite and general malaise. Always in such instances the existence of some complication is to be suspected and the examination conducted with especial care.

DIAGNOSIS.

The diagnosis of internal hemorrhoids is not always a simple matter. When the tumors are prolapsed or when they can be made to protrude by voluntary effort of the patient, inspection alone is sufficient. But such favorable circumstances are presented in only a relatively small percentage of cases. One who would make his diagnoses in this, as in other rectal diseases, with certainty and accuracy, must be prepared both to weigh the symptoms carefully and to employ the various methods of examination with discriminating thoroughness.

The history having been obtained, the patient may be placed upon the examining table in either the right or left lateral position. *Inspection* will at once disclose the presence or absence of prolapsed tumors. In very many cases when not at first visible they may be brought into view by making traction upon the sides of the anus and directing the patient to push down forcibly. Or an enema may be administered and the patient requested to expel it in the attitude of defecation, when the tumors will ordinarily be protruded and the diagnosis may be readily made. If hemorrhoidal tumors are present, the further examination should be directed to determining the existence or non-existence of associate pathology in the rectum and contiguous organs.

When inspection is not sufficient for diagnosis *digital examination* should follow. The value of this procedure has been seriously questioned, certain authorities maintaining that an internal hemorrhoidal tumor cannot be detected by the sense of touch. This is doubtless true as applied to the earlier stages of development. But a tumor of long-standing in which the usual connective tissue changes have occurred, can assuredly often be felt and its approximate size and location determined by the examining finger. Before withdrawal the finger should be swept entirely around the hemorrhoid-bearing area and the exploration made to include all of the rectum within reach as well as the adjacent pelvic organs and structures.

Instrumental examination is best made with the short proctoscope (one and one-half to two inches in length), since by this means the entire circumference of the region involved is at once exposed. A bivalve speculum may be made to answer the purpose quite satisfactorily, though as a rule its use is attended with greater discomfort and occasions more traumatism.

A mistake sometimes made in examining for internal hemorrhoids grows out of an erroneous idea of their normal location. They *do not* occur in the upper part of the rectum. The area involved is at and immediately contiguous to the plane of junction of the movable rectum with the anal canal,—rarely more than two inches above the anal opening. The only exception to this rule is found in the capillary hemorrhoid which may occur at a higher site and require a much more prolonged and painstaking examination to locate it.

The advisability of extending the examination as a matter of routine to the other pelvic viscera has been referred to. This is particularly true in the case of women. It would manifestly be poor surgery to remove a mass of hemorrhoids and overlook a displaced uterus obstructing the return circulation, or an ovarian cystoma adherent to or pressing upon the rectum.

Provided the rule is adopted and strictly adhered to of requiring a physical examination in every case, the differential diagnosis of internal hemorrhoids is easily made. Given a case presenting a protrusion of some kind at the anus, the only conditions likely to cause confusion are cancer involving the anal canal, polypus, and procidentia recti. In each of these the appearance is usually sufficiently distinctive to prevent a mistake.

Cancer in this region, by the time it comes under clinical observation, is generally ulcerated, painful to the touch, bleeds freely, and is evidently an outgrowth from an indurated base with a marked tendency to spread in all directions.

A polypus is more globular in shape and paler in color than a prolapsed pile tumor, and is attached to the rectal wall by a narrow pedicle sometimes several inches in length.

Procidentia recti usually involves the whole circumference of the bowel uniformly, is of a bright red instead of purple color, is larger and more regular in shape than a mass of hemorrhoidal tumors, presents a slit-like opening at the apex of the conical protrusion, and occurs most frequently in early childhood. The error is probably much more often made of mistaking prolapsed internal hemorrhoids for this condition than the reverse.

PROGNOSIS.

The prognosis of internal hemorrhoids, generally speaking, may be said to be good so far as concerns danger to life. Exceptionally, a well-developed case may exist for many years and be carried to the grave without having occasioned more than local discomfort. But it cannot be denied that the natural tendency of the malady is to produce permanent ill-health and that death has been often hastened, and even directly caused, by it.

There is little or no disposition to spontaneous recovery from the trouble. Such instances are occasionally heard of, but investigation seldom fails to disclose that self-made diagnoses form the basis of these claims. The disease process once established may be expected to persist throughout life. There is probably no more prolific cause of suffering and disability among all human ailments, nor one more surely and readily amenable to proper treatment.

TREATMENT.

Probably more ingenuity has been displayed in devising methods and measures for the relief of internal hemorrhoids than any other single disease. The early literature of the subject abounds in interesting

accounts of the practices advocated and followed, in which the supernatural and the fantastic vie for honors. Charms, amulets, and incantations held a conspicuous place among the therapeutic agencies of that ancient day, and the treatment of hemorrhoids was customarily undertaken by such means, unless, indeed, the supposedly beneficent nature of the malady did not forbid efforts at treatment of any kind.

Knowledge is slow to dispel ignorance and superstition. Even today there are certain individuals in every community who carry buckeyes in their pockets both as preventives and as infallible cures, and others, of even the more enlightened classes, who esteem the pile remedy of some ignorant old granny or "hoodoo" darkey more potent for good than the combined wisdom and skill of the medical profession.

The treatment of internal hemorrhoids may be classified as palliative and operative.

Palliative Treatment.—It is well to preface the discussion of this phase of the subject by laying down and emphasizing one fact, namely, that when the disease process has resulted in the formation of organized tumors remedies, local, constitutional, or combined, are utterly powerless to remove them. The proportion of cases first seen clinically at this stage of their development is very large. Justice to the patients as well as a due regard for his own reputation, should impel the physician to state clearly the probable limitations of non-operative treatment in every case.

Aside from the indisputable fact that a patient has the right to decide for himself whether or not he will submit to operation, palliative measures may sometimes offer the safest and best plan of treatment. It was pointed out in the discussion of the symptom of hemorrhage that the loss of blood from the hemorrhoidal vessels may occasionally serve a salutary purpose,—in other words, that operation may be contraindicated in certain cases. Again, it is a truth which should be more generally recognized that relief is perfectly possible in many cases without resort to surgery. This applies particularly to cases seen early, where the pathology has not advanced beyond the stage of congestion and varicosity. If patients will take the necessary trouble in such cases, they may be safely assured of permanent relief from all symptoms, which, practically speaking, is cure of the disease. While it is true that cases are not often seen at this favorable stage, much can be done to relieve symptoms and promote comfort at all stages.

The reduction of protrusion, the control of hemorrhage, the alleviation of pain, the allaying of inflammation, and the prevention of congestion are the specific benefits which may be expected to follow the proper employment of palliative measures.

When the protrusion is complicated by strangulation, as is not infrequently the condition when the case is first seen, the problem presented is both urgent and difficult. Assuming that the radical operation is refused or contraindicated, replacement of the prolapsed tumors is the immediate indication. In many cases this is far from a simple matter, for before medical assistance is sought the desperate efforts of the patients will have resulted in bruising the parts, producing greater swelling and increasing the spasmodic contraction of the sphincters, thus adding tenfold to the difficulties of the undertaking. If gone about in the right way, however, the reduction may generally be effected. The application of cold-water compresses or a bag of crushed ice will usually reduce the tumefaction, and at the same time contribute much to the comfort of the patient. Sometimes a hot poultice seems to act better;



Fig. 102.—Hemorrhoidal truss.

or an anodyne and astringent ointment may be applied and covered with hot compresses or a hot-water bottle. A suitable ointment for this purpose is:—

R Cocainæ muriatis	gr. x.
Ext. belladonnæ	ʒss.
Ext. opii	ʒj.
Glycerini	ʒij.
Unguent. ac. tannici (10 per cent.)	ʒj.

When the sensibility has been sufficiently obtunded the tumor mass should be well anointed with olive oil or other lubricant, the index finger slowly inserted into the bowel, and around it as a center gentle taxis made with the fingers of the other hand. Success is assured if a single tumor can be made to return. Should reduction in this way prove impossible, in order to prevent gangrene and its consequent dangers, the sphincter muscles may be divided under local anesthesia, or divulsed under general anesthesia. In either event the patient's consent to the performance of the radical operation at the same time will not often be withheld.

Several forms of hemorrhoidal trusses (Fig. 102) have been devised for preventing protrusion. At best these are unsatisfactory makeshifts. When the tendency is so pronounced as to suggest this means of relief,

the patient's interests will be conserved from every point of view by submission to the radical operation.

Hemorrhage is seldom so excessive as to place life in immediate jeopardy; but it is always the cause of anxiety and very often of ill-health. When the symptom calls for special treatment the local application of ice, cold water, or styptics, rest in the recumbent position, and the prevention of straining and traumatism by securing soft stools, will generally fulfill all requirements.

Pain and inflammation are usually associated, and are most severe when the tumors are protruded and strangulated. At other times a dull aching, or merely a sensation of weight and local discomfort may be complained of. The list of favorite pile-ointments recommended is a long one, and the list of sure-cure nostrums advertised even longer.



Fig. 103.—Perforated pile-pipe.

Unquestionably much may be done by the use of local remedies to allay inflammation and subdue pain; but they should always be employed with the idea of palliation, not cure. As a rule ointments constitute the best form of local applications, though dusting powders, lotions and suppositories are all advised. When the hemorrhoids protrude at stool they should be gently bathed and the ointment applied before they are replaced; otherwise the hard-rubber pile pipe with perforations on the sides (Fig. 103) is the readiest means of reaching the diseased parts. The following formulæ will be found useful, the ingredients and proportions being varied to meet special indications:—

R Morphina sulph.	gr. x.
Hydrarg. chlor. mit.	gr. xx.
Ung. belladonnæ,	
Glycerini	āā ʒij.
Vaselinæ	ʒj.
 R Orthoformi	ʒj.
Ichthyol.	ʒss.
Ung. stramonii	ʒss.
Petrolati	q. s. ad ʒj.

℞ Cocainæ muriat.	gr. v.
Ext. opii	3j.
Lanolinæ,	
Ung. ac. tannici (10 per cent.)	āā ʒss.
℞ Ung. gallæ et opii,	
Vaselinæ	āā 3j.

.When the arrest of hemorrhage is especially called for the following combination is a good one:—

℞ Ext. suprarenal gland,	
Ext. opii	āā 3j.
Ung. simplicis	3j.

Speaking in general terms of the non-operative treatment, it should be said that, properly considered, its object is prevention as well as palliation and that, since congestion of the hemorrhoidal vessels is the primary pathologic condition in the development of the disease, hygienic measures are as worthy of consideration as medicinal agents. The more important principles of non-operative treatment may be tersely summarized: Keeping the bowel function regular; careful avoidance of costiveness and straining; the habitual use of cold water locally, especially after stools; regulation of the diet; exercise, of judicious kind and amount; recognition of the possible existence of contributory causes of a constitutional nature and proper attention to them; the employment of astringent, emollient or anodyne applications; and rest in the recumbent position when inflammation is present or an "attack of piles" is threatened. The action and utility of each of these measures are obvious. The value of one of them, however, calls for a word of special emphasis. The benefits to be derived from the use of cold water in the treatment of internal hemorrhoids do not seem to be fully appreciated, when the truth is that in the large majority of cases they are more positive than those of any other topical application. The therapeutic action of this agent in constricting and toning blood-vessels and allaying inflammation is well recognized. Yet in this disease, with every indication for its employment present in a peculiar and marked degree, it is practically ignored. In the management of these cases without resort to surgery it is the author's rule to lay special stress upon the toilet of the rectum; to interdict the use of ordinary detergents; and to direct that the parts be freely bathed with cold water after each stool and a moderate quantity ($\frac{1}{4}$ to $\frac{1}{2}$ pint) thrown into the bowel once or twice daily with the syringe. By this means, together with careful observance of the principles above mentioned, the average patient may be kept comfortable for an indefinite time.

Operative Treatment.—Is it permissible to operate upon internal hemorrhoids when inflamed? This preliminary question is a very important one. Inflammation and the pain caused by it are the immediate occasion for the seeking of medical attention in many cases, and the advice given should be both safe and sound. The proper answer to the question is unreservedly affirmative. Loss of time and unnecessary suffering are the inevitable penalties of temporizing, and nothing is gained to offset them. In the author's experience operation may be done as safely in the acutely inflamed as in the non-inflamed condition, and the results are in every way as satisfactory. If reassured to this effect, the patient's consent to operation is certainly more readily gained under such circumstances, and his ultimate interests as certainly conserved. Even though strangulated and gangrenous, it is better to remove the offending tumors than for the patient to undergo the dangers of sepsis and hemorrhage incident to nature's attempt at a cure, knowing that the time required will necessarily be longer, the suffering greater, and the final result, most likely, far from satisfactory.

The list of the operative procedures which have been advocated for the cure of internal hemorrhoids includes:—

1. Divulsion of the sphincters.
2. Application of chemical caustics.
3. Electrolysis.
4. Crushing.
5. Torsion.
6. Injection.
7. Excision.
8. Whitehead's operation.
9. The ligature operation.
10. The clamp and cautery operation.
11. The clamp and suture operation.

It is neither necessary nor desirable to discuss each of these several methods in detail. A number of them are obsolete in the practice of the present day, and the majority of them is to be condemned as inefficient or dangerous. A few words of comment in passing, however, will conduce to a broader understanding of the subject.

1. Divulsion of the Sphincters.—In the initial stages, when the disease process has not advanced beyond the point of dilatation and varicosity of the vessels, divulsion of the sphincters may undoubtedly act as a beneficial measure; but after the formation of organized tumors it is manifestly powerless to cause their disappearance. Indeed, in the more advanced stages, a relaxed condition of the sphincters

permitting the tumors to prolapse on the slightest provocation is often one of the most annoying features of the disease. A further stretching in such cases would only add insult to injury.

The proper technique of the procedure has been described in the chapter on fissure. The several anal dilators and rectal divulsors which have been recommended for accomplishing the manipulation more easily and rapidly are to be condemned as instruments much more potent for evil than for good. Even more indefensible is the method of dilatation by gradually insinuating the entire hand into the rectum, closing the fist, and forcibly withdrawing it. It is surprising to find that a late textbook by a recognized authority contains an elaborate description of this barbarous practice, and actually stamps it with the seal of approval. There is no short cut for the proper execution of this important procedure. The fingers are the only instruments to be employed, the additional time required by this method being well spent in the interest of the patient's future comfort and happiness.

While not curative in advanced cases, dilatation is of decided value as a preliminary step of the radical operation, rendering the parts easier of access and, when the sphincter is contracted and irritable, greatly lessening the after suffering of the patient. In the primary stage of the hemorrhoidal disease gradual dilation by means of bougies, together with the employment of cold water as previously referred to, will sometimes result in marked improvement or even complete and permanent relief.

2. Application of Chemical Caustics.—This method of treatment has nothing to recommend it. The action of the caustic agents is slow, uncertain, and difficult to limit to the desired area, and the whole process in the light of clinical experience unsurgical and dangerous. Only in the rare variety of internal hemorrhoids known as capillary or nevoid, has the method a possible field of usefulness. Here a drop of pure nitric acid applied and carefully confined to the growth is a very efficient means of destroying it, though it may have to be repeated several times and is not so dependable as other methods, *e.g.*, the actual cautery.

Caustic potash, acid nitrate of mercury, nitrate of silver, and Vienna paste, are other caustic agents which have been recommended in this connection. The pure nitric acid is far the best. When the application is confined to the mucosa it is practically painless.

3. Electrolysis is rarely resorted to at the present time in treating internal hemorrhoids. It is practised by passing one or more needles connected with the negative electrode into the substance of the pile

tumor and completing the circuit by applying the positive pole to the buttock or other adjacent part by means of a damp sponge. The current is then turned on until the tumor becomes white, which requires from three to ten minutes depending upon the strength used. This treatment is claimed to cause obliteration of the blood-vessels with subsequent atrophy and absorption of the tumor. It is necessary, however, to repeat it often, a more or less elaborate and troublesome apparatus is required, and the result cannot be compared, as to certainty and permanency, with that obtained by the more strictly surgical methods of treatment.

4. **Crushing** and (5) **torsion** are methods similar in principle but differing in the means employed. The English surgeon, Mr. Pollock, was a notable modern advocate of the former, having devised a special instrument for the purpose. More recently the powerful angiotribe fitted with special shaped blades, has been employed with success.

The torsion method, of which Dr. Manley, of New York, was the conspicuous advocate, seeks to accomplish the same object with the fingers alone, each pile tumor being grasped separately and crushed and twisted to a pulp. The *écraseur* has been employed for a similar purpose, especially by the French surgeons, M. Chassaignac being one of its ablest champions. None of these methods is in keeping with modern ideas of surgical practice and all are open to grave objections. Inadequate provision against hemorrhage is alone sufficient to condemn each of them.

6. **Injection.**—This is often referred to by foreign writers as the American method of treatment, a designation pleasing enough to its advocates, but containing little cause for gratification to those who condemn and reject it. There is no question that the method originated in the United States. Andrews, of Chicago, who investigated the early history of the method with great care, states² that it was first employed by a young physician named Mitchell, of Clinton, Ill., in 1871. The fame of the method spread rapidly through that section of the country, and within a few years it was being used promiscuously by itinerant charlatans, not all of whom were members of the medical profession and many of whom were ignorant and irresponsible. Exploited in this way, it soon gained a wide reputation and thousands of patients were treated by the new plan, the secret of which was closely guarded.

The fact that for so many years the treatment of this class of diseases remained largely in the hands of charlatans, in America at

² Diseases of the Rectum and Anus, pp. 34 *et seq.*

least, is directly attributable to the remarkable exploitation of this method at a time when the subject had been receiving little attention at the hands of the regular profession. The present day interest in the treatment of hemorrhoids and in rectal diseases in general is probably due in no small measure to the ultimate realization by the profession that an important and profitable department of practice was passing from its hands.

For many years physicians regarded the secret method with outspoken contempt. With scarcely an exception, medical writers referred to it slightly or condemned it and its users in the most sweeping terms. And the same attitude is maintained to a certain extent today, with the result that the method is still being successfully exploited in all parts of the country by "no-knife" advertisers, to the continued detriment and chagrin of the self-respecting profession. There is in reality no reason or excuse for the existence of such a state of affairs. The method is not and has not for many years been a secret. The profession should consider without prejudice whatever merits it may possess and so be in position to advise the public intelligently upon the subject.

Practically all of the more recent American textbooks on diseases of the rectum devote considerable space to discussion of the method, with varying conclusions as to its efficacy and value. None of them condemns it as wholly worthless; but all agree that its field of application is a very limited one, and that the details of technique must be thoroughly mastered to insure a proper degree of freedom from danger in its use.

Carbolic acid is conceded to have been the active ingredient of the original formula as used by Mitchell. Many different drugs and combinations of drugs have since been experimented with, but the carbolic acid retains its reputation as the most efficient agent for the purpose. The strength employed has varied from 5 per cent. to 95 per cent. At the present time a 25 per cent. or $33\frac{1}{3}$ per cent. solution is most generally used.

A few of the formulas for the injection fluid which have been most strongly recommended are here given:—

R Ac. carbolic	.....	℥j.
Zinci chloridi	.....	gr. viij.
Ol. olivæ	.....	℥v.

This was the wonderful remedy of the celebrated Brinkerhoff.

R Ac. carbolic,	
Glycerini,	
Aquæ dest.	.....āā ℥j.

GANT.

R Ac. carbolic.,	
Ext. ergotæ fl.,	
Ol. olivæ	ââ partes æquales.

OVERALL.

R Ac. carbolic. (cryst.)	3j.
Aquæ dest.	3ij.
Sod. biboratis et plumbi glyc.	3vj.

AGNEW.

R Ac. carbolic. (Calvert's)	3ij.
Ac. salicylic.	3ss.
Sod. biboratis	3j.
Glycerini	q. s. ad 3j.

TUTTLE.

From 5 to 20 minims of the solution to be used are injected into the body of the pile tumor by means of a hypodermic needle. The amount to be injected varies with the size of the tumor, and the strength of the solution chosen is determined by the effect it is desired to produce.

Two very different conceptions of what is sought to be accomplished by the injection method of treatment are defended by their advocates. One is that the object is to cause necrosis and sloughing of the tumors. This view is vigorously championed by Agnew, of San Francisco, who maintains that a radical cure may be safely effected in this way. The great majority of those who employ the method, however, claim that such a result is always to be avoided, holding that the remedy injected is only intended to cause obliteration of the blood-vessels of the tumor with resulting atrophy, and that, when sloughing follows, it is to be regarded as an unfortunate accident. Those who entertain the former view use the stronger solutions and larger quantities, while the advocates of the latter view use the weaker solutions and are more guarded as to the amount injected.

It is clear that the last mentioned view represents safety and conservatism. The most casual reflection would seem sufficient to settle the question. The sloughing process is not more susceptible of being controlled in this region than elsewhere, nor are the dangers of hemorrhage, sepsis, and vicious cicatrization less to be regarded. These are the identical dangers from which we strive to protect a patient when his hemorrhoids become prolapsed and strangulated and nature threatens to undertake a cure by means of gangrenous ulceration.

The technique of the method is simple. As a rule only one tumor at a time should be treated, though when they are of small size

and remain above the grasp of the sphincter, two or even three may be injected at the same sitting. While an ordinary hypodermic syringe will serve the purpose, one of larger size and provided with a goose-neck extension piece (Fig. 104) will be found more convenient. The bowel should be evacuated and irrigated before each treatment, and the parts scrupulously cleansed at the time of the injection. The needle is inserted well into the substance of the tumor selected for treatment, and from 5 to 20 minims of the carbolic acid solution slowly injected. The needle is left in place for a few minutes in order that the remedy may have time to act, and the surrounding parts be protected from any fluid which may chance to escape upon its withdrawal. If prolapsed, the tumors should be at once replaced. When necessary to use an instrument to expose the tumors, a conical speculum with a



Fig. 104.—Large-size hypodermic syringe with goose-neck extension piece.

sliding window will prove satisfactory, the instrument being rotated or reintroduced until a tumor presents through the opening. A simple dressing of sterilized petrolatum or other unguent is applied on a compress of sterile gauze, and held in place by means of a light pad and T-bandage.

The treatment usually causes little or no pain; but, when administered in the office, the patient should be kept in the recumbent position for an hour, after which, if comfortable, he may return home. It is sometimes possible for a patient to resume his ordinary duties at once following a treatment. The results are better, however, when prudence is observed in this respect. If good judgment is exercised as to the amount of solution injected, a tumor rarely requires more than one treatment. After an interval of from two to five days, depending upon the degree of reaction, another tumor is treated, and so on until all have received attention.

It is of special importance that the needle be inserted to the proper depth before any part of the injection fluid is forced into the

tumor. If deposited too near the mucous covering, ulceration and sloughing are apt to follow. On the other hand, if the needle is carried too deeply, the gut wall will be invaded and acute inflammation, abscess formation, and perhaps general sepsis are likely to ensue. It is highly probable that many of the accidents and disastrous sequelæ which have resulted from this method of treatment were due to faulty technique in one or the other of these respects, rather than to error of judgment in the solution employed.

Now, what of the merits of the method? It seems impossible that any plan or system of treatment should have flourished for forty years in a civilized country without possessing some claim to recognition. That it furnishes a means of handling some patients who will not consent to the radical operation and of affording at least temporary relief in the great majority of cases in which it is properly used, cannot be gainsaid. But the only standards by which a surgical procedure may be fairly measured are safety in execution, and certainty and permanence of cure. Andrews collected more than 3000 of the early cases treated by this method which showed a mortality of about 0.4 of 1 per cent. and, as compared with other methods, a large proportion of accidents and unfortunate end-results, including embolism and abscess of the liver, dangerous hemorrhage, stricture of the rectum, sloughing and other accidents (1 per cent.), violent pain ($2\frac{1}{2}$ per cent.), etc. Failure to cure was noted in 19 instances (0.6 of 1 per cent.); but the number of cases in which recurrences occurred was not stated for the obvious reason that data on this point were not available at the time the statistics were compiled. The author's personal observation embraces 2 cases in which death was directly traceable to the injection of hemorrhoids; one, that of a young lady in which extensive sloughing involving the buttocks and perineal region occurred, the other³ that of a strong healthy man in which the fatal issue followed the formation of a large pelvic abscess and general sepsis. In addition the author has been called upon to perform the radical operation, not once or twice, but repeatedly, upon patients who had had their piles injected five to ten years previously, and who had for a time fancied themselves cured. The last case of the kind now referred to was operated upon within three weeks of the time at which these words were being written.

When contrasted with any one of the recognized radical operations, the injection method of treatment falls short on every count. For example: Allingham has recorded over 4000 operations by the ligature

³ This case is recorded in detail in the chapter on Perirectal Abscess.

method with but 5 deaths, a mortality of only a little more than 0.1 of 1 per cent. Mathews, of Louisville, and Straus, of St. Louis, have both reported series of 1000 operations by the same method with no mortality; in approximately 1000 operations by various methods the author has had only 1 death, the patient in this case being already profoundly septic from a neglected gangrenous condition of his strangulated piles at the time the ligature operation was performed. In no other instance of the entire series was life even seriously threatened. In this connection, Kelsey, after enumerating the several dangers of the injection method as shown by his personal experience and stating with emphasis that it does not result in a radical cure, says:⁴ “. . . and all the patient actually gains in the most favorable case is the avoidance of a safe operation which he fears, while he submits to an uncertain one which he does not fear because of his ignorance, together with a few days of liberty during which he would be better off in his room.”

Since the perfecting of the technique of local anesthesia in anorectal surgery it is possible to perform the radical operation for internal hemorrhoids painlessly and with less experience than is required for the successful management of the injection treatment. Thus, eliminating from consideration the question of general anesthesia, it would seem that the injection treatment has no sound basis of merit or advantage to justify its employment at the present day. In fact, after viewing the matter impartially from every standpoint, the conclusion seems warranted that it is at best an unscientific and unsurgical makeshift which has been too long exploited at the expense of a credulous public,— that it is not without danger in any case and permits no honest assurance to a patient of permanency of cure, should real danger be escaped. If the treatment is undertaken after a full explanation on all points, the responsibility may in a sense be shifted to the patient. But while he may possibly soothe his conscience in this way, the surgeon certainly does not uphold the highest ideals of his profession.

7. Excision.—Though advocated and practised by many renowned surgeons this method of treating internal hemorrhoids is undoubtedly the most dangerous in the entire list. The danger consists in the great liability to hemorrhage, primary and secondary, and the difficulty in providing efficient means for its control. To minimize this danger many innovations in technique have been introduced from time to time, such as passing a needle deeply through the base of the tumor to prevent retraction of the stump and leaving it *in situ*, endeavoring to ligate or twist each vessel separately as encountered, plugging the anal canal tightly

⁴ Diseases of the Rectum and Anus, 4th edition, p. 189.

and making pressure from without on completion of the operation, etc. None of these measures is to be relied upon and, in spite of the resources of modern surgery, he is a bold and reckless operator who will undertake the removal of internal hemorrhoids without making adequate provision against danger from hemorrhage.

With a single notable exception, *i.e.*, Whitehead's operation, practically all the methods devised by the older surgeons for operating by excision have fallen into disuse. More recently two American surgeons, Pennington, of Chicago, and Earle, of Baltimore, have worked out ingenious methods which deserve more than passing reference. Pennington's enucleation operation, described in his own words, is performed as follows:⁵—

"Each anal quadrant is grasped at the mucocutaneous junction with a pair of T-forceps. By means of these the anus is everted and the internal tumors exposed. Now, seizing with the full hand the forceps attached to the posterior quadrant, evert it, and with a pair of scissors sharply curved on the flat remove an ellipse from the apex of the hemorrhoid commensurate with the size of the tumor. All of the angiomatous tissue is then removed, when the remaining wall collapses. A stream of hot saline solution (115° to 125° F.) flows over the field continuously during the operation. Spurting vessels, if any, are caught with a pair of forceps and thoroughly twisted. The T-forceps are now removed, and all external tumors and tabs of skin cut off. The field is dusted with some antiseptic powder and a rubber-covered tampon introduced through a bivalve speculum. By dressing the patient in this manner, a fibrinous exudate is deposited over the operated field, which exudate is neither destroyed nor disturbed upon removal of the dressings. Moreover, the danger of stricture is obviated, as the normal calibre of the bowel is left practically covered with mucous membrane. At the end of forty-eight hours the patient is given a cathartic, the tampon removed, and the usual after-treatment observed."

If this method could be considered safe, it would be in certain respects a distinct improvement over the older operations. But the provision against hemorrhage which consists only of the "twisting of spurting vessels, if any" and the introduction of a rubber-covered tampon, can hardly be regarded as fulfilling the requirements of hemostasis in this region. In the hands of its experienced originator the danger from this source may be, and doubtless is, reduced to a minimum, but in the hands of the average operator it is certainly a valid objection to the method.

⁵ International Journal of Surgery, Dec., 1900.

Earle's method was devised to overcome the disadvantages of the Whitehead operation. In this it succeeds admirably. A clamp of special design (Fig. 105) is the essential feature of this method. The technique consists in drawing down the tumors, adjusting the clamp transversely to the base at the anal margin, amputating the overlying hemorrhoidal tissue, and applying a continuous catgut suture alternately under and over the clamp blades throughout its length. The clamp is then removed and reapplied until the entire pile-bearing area has been removed and the anus completely encircled with the continuous suture. By this method the loss of blood incident to the Whitehead method is prevented and the operation much more expeditiously performed. In addition it furnishes a ready means of applying the principle of the

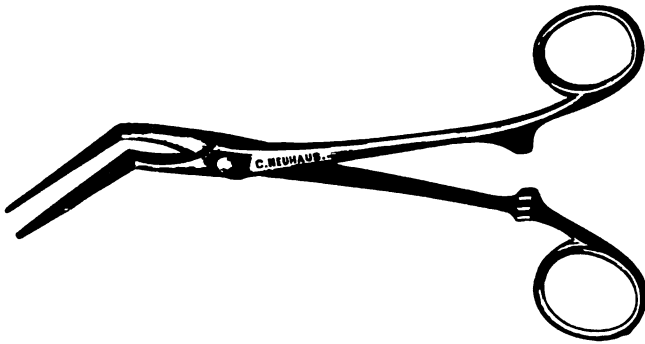


Fig. 105.—Earle's pile-clamp for suturing operation.

Whitehead operation to limited areas, rendering it possible to remove one or several tumors and at the same time accurately close the resulting wounds. While the method is not free from certain of the objections which attach to the Whitehead operation, it is one of the simplest and best methods of excising hemorrhoids yet devised.

8. Whitehead's Operation.—This is sometimes known as the method of circular excision. It was devised by Mr. Walter Whitehead, of Manchester, England, to meet, as he stated, his personal dissatisfaction with the ligature and clamp and cautery methods. In a paper presented to the British Medical Association in 1877 and published in the *British Medical Journal*, February 26th, of the same year, he describes the technique of his method as follows: The patient, having been properly prepared and fully anesthetized, is retained in the lithotomy position. "The sphincters are thoroughly paralyzed by digital stretching so that they have no 'grip,' and permit the hemorrhoids and any prolapse there may be to descend without the slightest

impediment. By the use of scissors and dissecting forceps, the mucous membrane is divided at its juncture with the skin around the entire circumference of the bowel, every irregularity of the skin being carefully followed (Figs. 106 and 107). The external and the commencement of the internal sphincters are then exposed by a rapid dissection, and the mucous membrane and attached hemorrhoids, thus separated from the submucous bed on which they rested, are pulled bodily down, any undivided points of resistance being snipped across, and the hemorrhoids brought below the margin of the skin. The mucous membrane above the

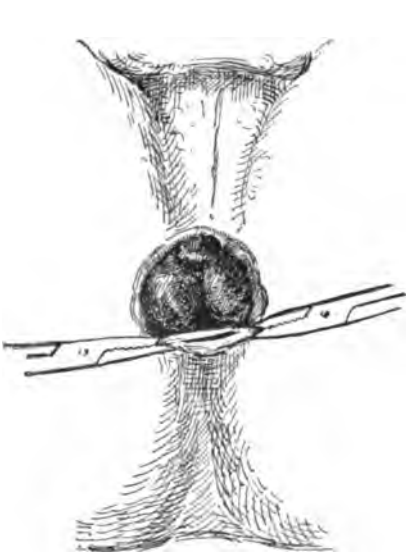


Fig. 106.—Whitehead's operation.
Dissection. (After Tuttle.)



Fig. 107.—Whitehead's operation.
Dissection. (After Tuttle.)

hemorrhoids is now divided transversely in successive stages, and the free margin of the severed membrane above is attached, as soon as divided, to the free margin of the skin below by a suitable number of sutures (Figs. 108 and 109). The complete ring of pile-bearing mucous membrane is thus removed. Bleeding vessels throughout the operation are twisted on division."

This is certainly a radical operation. It is equally certainly not often a justifiable one. The idea of pathology upon which it is based, namely, that the disease process is not confined to the tumors, but involves the entire hemorrhoidal plexus of vessels, is undoubtedly the correct one. But the fact is overwhelmingly attested that no such extensive mutilation

of the parts is necessary to effect a cure. That the enormous loss of blood incident to the performance of the Whitehead operation is a serious drawback is universally conceded. Scarcely less so is the ever-present danger of impairment of function by the substitution of abnormal relations, or as the result of vicious cicatrization. It is the most dangerous, the most complicated, and the most painful of all operations for internal hemorrhoids. The tension of the sutures not only causes pain and invites infection, but is not infrequently too great for the strength of the tissues,

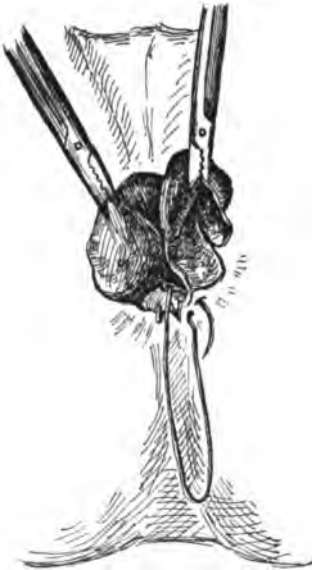


Fig. 103.—Whitehead's operation.
Sutures. (After Tuttle.)



Fig. 109.—Whitehead's operation.
Sutures. (After Tuttle.)

and wide separation of the edges of the wound results. Abscess and fistula, chronic ulceration, pruritus, stricture and incontinence are among the dire possibilities which the surgeon must face when he resorts to this method.

Gant, after defining the one condition in which he considers the procedure indicated, well says:⁶ "If the operation were confined to selected cases, the writer would have only words of commendation for it. Unfortunately it is being done promiscuously by surgeons to the exclusion of more simple and better operations, irrespective of the number and size of the piles. As a result rectal specialists are constantly besieged

⁶ Diseases of the Rectum and Anus, p. 451.

by victims of Whitehead's operation, for whom they can do nothing to cure and little to alleviate."

The so-called "American Operation," loudly heralded a few years ago by Pratt, of Chicago, and his followers, is merely a modification of the Whitehead method in which the dissection is made from above downward. It is in no sense an improvement upon the latter. The application of the term, American, to it was an exhibition of prodigious effrontery which the American profession rightly resents.

9. **The Ligature Operation.**—This is undoubtedly the most venerable in origin of all the methods in current use for the surgical treatment of internal hemorrhoids. It has also undoubtedly been employed oftener and by a larger number of operators than any other method. There is abundant evidence that ligation was the method favored by Hippocrates and his disciples, and coming down through the centuries, it seems always to have received the practical endorsement of the great majority of eminent surgeons.

But in spite of its phenomenal record of success, a record unrivaled in all the history of surgery, the method is much less popular at the present time than formerly. This is due to no comparative advantage in the statistics of recent claimants to professional favor, but rather to recognition of the fact that the ligature method possesses certain inherent and insuperable objections antagonistic to the trend of modern surgical teaching. The many innovations of recent years owe their inspiration largely to the recognition of these objections and the attempt to overcome them. While, judged from a theoretical standpoint, several of the newer operations conform more closely to established surgical principles, the virtues of *simplicity*, *safety* and *certainly of cure* universally conceded to the ligature method, render it extremely doubtful whether it should be, or ever will be, abandoned.

To obtain the best results and insure the greatest degree of comfort in the after-treatment, the preparation of the patient for all hemorrhoidal operations should receive careful attention. Indeed, the details of the operation itself are not of greater importance. The following will be found a satisfactory working plan: For the two days preceding the operation the diet should be restricted to the most easily digested food. On the second night preceding, steps should be taken to secure thorough evacuation of the bowels by ordering 3 grains each of calomel and sodium bicarbonate to be given in broken doses, and followed the next morning by a full dose of castor oil. The night before the appointed time, if the operation contemplated will involve external work in addition to removal of the hemorrhoids, the parts should be shaved and cleansed and an antiseptic pad applied. At least two hours previous to the operation a

soap-suds enema should be administered and the antiseptic compress reapplied. A half hour before being taken to the operating room the patient should receive a hypodermic injection of morphine sulphate gr. $\frac{1}{6}$ to $\frac{1}{4}$ and atropine sulphate or scopolamine hydrobromide gr. $\frac{1}{150}$, whether a general anesthetic is to be given or not, and the bladder be completely emptied. When arranged upon the table, preferably in the lithotomy position, the surgical cleansing should be done. If the pile tumors are well protruded, they should be irrigated with a 1:2000 bichloride solution and the surrounding region scrupulously cleansed and covered with sterile towels. If divulsion of the sphincters is necessary, this should be followed by irrigation of the lower bowel with a bichloride solution (1:3000 or 4000) and the operative field protected from contamination by the introduction of a strip of sterile gauze into the rectum, remembering always to withdraw the latter when the operation is completed.

If a general anesthetic is to be employed, ether should be the agent chosen in all but exceptional cases because of its relative safety. Many of the disagreeable features of etherization may be eliminated by the preliminary administration of nitrous oxide. Chloroform is much less objectionable to the patient and the author has learned to look upon it without the usual apprehension in cases requiring divulsion of the sphincters. Spinal anesthesia is endorsed by some; but, in the face of the many accidents reported from its use and the elements of danger and uncertainty inseparable from it, is not to be recommended. A separate chapter will be devoted to the consideration of local anesthesia in rectal surgery. Here it will only be stated that the majority of uncomplicated cases of internal hemorrhoids are capable of being operated upon with perfect satisfaction by this means alone. At present the author employs it in not less than 75 per cent. of all such cases coming into his hands.

The technique of the ligature operation is exceedingly simple. It requires no special instruments or elaborate apparatus and presents the distinct advantage, when viewed with reference to the profession at large, of being as readily available for the use of the rural physician as for the city surgeon. The facility which is only acquired by experience, while of course desirable, is perhaps less essential in this than in any other surgical procedure of equal importance.

The principle upon which the ligature operation depends is strangulation of each tumor by tightly constricting its base with a strong ligature so that sloughing will result, leaving the wound to heal by granulation. Several methods of applying this principle which differ only in minor and unessential points, are in use at the present time. The distinctive feature of Mathews's method consists in passing a needle armed with the

ligature through the base of each tumor, cutting the needle free, and tying the two halves separately. The method known as Allingham's, but ascribed by him to Salmon, formerly surgeon at St. Mark's Hospital, differs in the point that a preliminary dissection of the base of each tumor is made before the ligature is applied. In this way a pedicle consisting only of the blood-vessels and proximal covering of mucosa is left, and the ligature becomes detached more quickly. Dr. B. Merrill Ricketts, of Cincinnati, has described a modification of the ligature operation in which the ligature is applied entirely beneath the mucosa by means of a curved needle, thus attempting to accomplish destruction of the pile-tumor without sacrificing any portion of the mucosa covering it (Fig. 110).

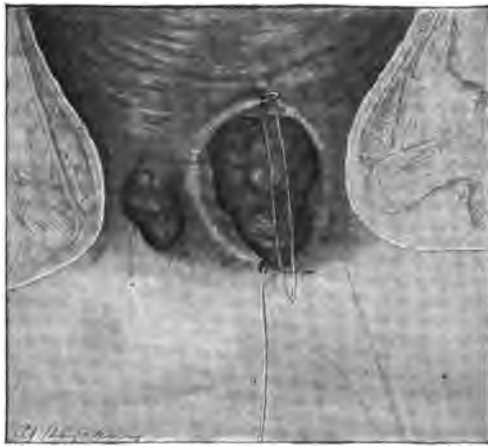


Fig. 110.—Submucous ligation. (Ricketts.)

Without discussing these several methods in detail, the technique described below will be found simple and satisfactory, and easily adapted to the varying conditions under which internal hemorrhoids are encountered: The patient being retained in the lithotomy position by means of the leg supporters attached to the operating table, or, in the absence of these, by the Clover's crutch or an assistant on either side, the parts are first carefully inspected to determine the amount and extent of involvement of the anal integument. If necessary the sphincters are then divulsed and the parts rendered as nearly antiseptic as possible. The novice will do well to attach an artery forceps to each of the tumors before beginning their removal, in order that none may be overlooked. Commencing below so that the field will not be obscured by blood subsequently, the first tumor to be removed is seized with a strong pair of T-forceps (Fig. 111) and lifted out from the gut wall. It is then

dissected from its base distally and laterally by means of a pair of moderate-sized (5-inch), curved, blunt-pointed scissors (Fig. 112). If the tumor is strictly of the internal variety, the dissection should start at the mucocutaneous line; if of the mixed or externointernal variety, it should start externally to the anal opening, so as to include the whole of the redundant skin, any spouting vessels being caught with pressure



Fig. 111.—Tuttle's T-forceps for grasping pile tumor.

forceps. The dissection is then continued upward until the tumor is only attached at its upper or proximal pole. To be assured of the safety of this procedure one need only remember that the arterial supply of an internal hemorrhoid enters from above immediately beneath the mucosa. Ordinarily about one third of the tumor should be left intact to be dealt with by the ligature (Fig. 113). The ligature, of twisted silk or linen, is

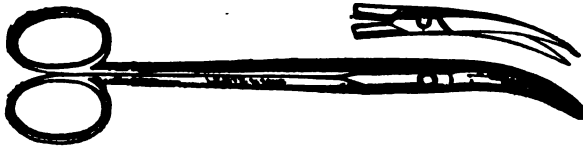


Fig. 112.—Blunt-pointed scissors, curved on flat.

then adjusted in the dissected furrow and tightly tied with three knots on the proximal side of the tumor. In the case of very large piles the dissection should be made so as not to sacrifice more than necessary of the mucous covering; and it is sometimes best to pass a needle armed with a double ligature through the center of the pedicle and tie the two halves separately upon the sound mucosa above, thus combining the methods of Mathews and Allingham (Fig. 114). Each tumor in turn is dealt with in like manner. When all have been ligated a portion of the tumors may be amputated, especial care being taken not to cut too close to the ligatures

and thereby render it possible for them to become loosened (Fig. 115). At this point, particularly where a number of tumors have been removed, the finger should be gently introduced into the rectum to determine whether or not undue constriction has been produced by the ligatures. If such is present, it may readily be broken down with the finger, or by snipping the mucosa with scissors at one or more points. The parts are then irrigated with an antiseptic solution, the stumps returned into the bowel, any remaining skin tabs cut away, a small strip of gauze lubricated with

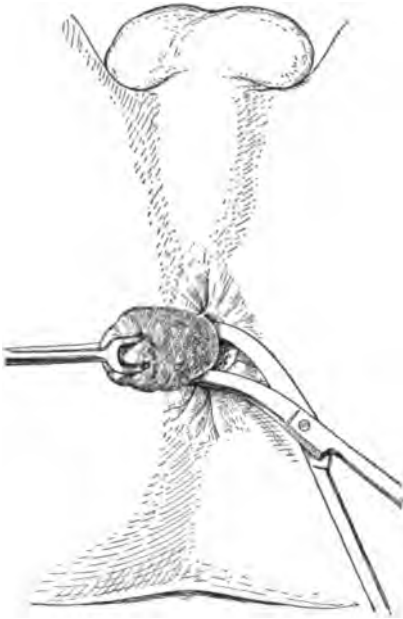


Fig. 113.—Operation by ligature.
Dissection.

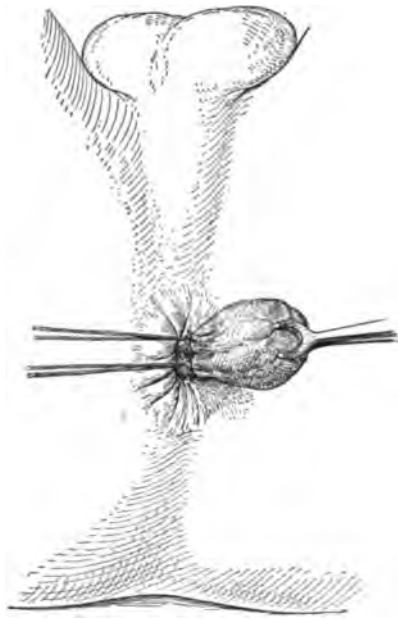


Fig. 114.—Operation by ligature.
Ligature tied.

sterile vaseline introduced into the bowel, and a firm compress applied to the anus and retained in position with a snugly adjusted T-bandage.

Care in the after-treatment means the difference between a week of comparative comfort and one which the patient will remember for the opposite reason. The closest attention during this period will be well repaid both by the lessened suffering of the patient and the more rapid healing of the wounds. Unless the services of a thoroughly competent and reliable nurse are available, the surgeon will do well to personally supervise the after-treatment of every case.

During the first twenty-four hours succeeding the operation one or two hypodermics of $\frac{1}{8}$ grain of morphine sulphate may be required to

relieve pain. Thereafter there should be no occasion for the administration of an opiate of any kind. The possibility of retention of urine should always be borne in mind. This is most apt to occur in male patients. In the author's experience it has been very rare since the old practice of packing the anal canal was abandoned. The dressings should be removed, the region sponged, and fresh dressings applied on the day following the operation, and subsequently as often as necessary. The



Fig. 115.—Operation by ligature. Tumor amputated.

former teaching that the bowels should not be opened before the fifth or a later day is erroneous and has been responsible for much unnecessary pain, not to mention the evil effects upon the general health of prolonged intestinal stasis. The danger of infection from the fecal discharges is practically negligible, as shown by the experience common at some time to most operators of having a movement to occur unexpectedly during the progress of the work or within a few hours afterward. The probability of mechanical injury following the expulsion of a costive stool requires no emphasis. It is the author's practice to order a full dose of castor oil to be given forty-eight hours following the operation,

instructing both the patient and the attendant that the evacuation is to be preceded by an enema of boric acid solution, one pint, followed by olive oil, two ounces, administered through a soft rubber catheter. Managed in this way neither pain nor damage results and the patient's general condition is at once improved. After each movement the parts should be carefully cleansed, any accessible raw surfaces touched with a solution of argyrol 20 per cent. or cargentos 5 per cent, and a soothing antiseptic ointment applied to the operative field by means of a perforated pile-pipe (see Fig. 103). A good formula for the ointment is:—

R. Ac. carbolic.	℥ viij.
Eucalyptol	℥ v.
Ext. opii	℥ j.
Ung. zinci oxidi	℥ j.

The ligatures, if left to themselves, will become detached in from four to eight days, depending upon the size of the pedicles. This may often be hastened by gentle manipulation from day to day; but traction should never be employed. It is always well to inform the patient that there may be some appearance of blood at stool during the first week or so from the granulating surfaces, otherwise there may be needless apprehension and dissatisfaction. Usually the patient may be allowed to leave his bed after the first evacuation of the bowels is secured, and to return to his business after the first week, reporting at the office daily thereafter. It is a good rule to permit no active exercise until all the ligatures have become detached.

It is probably true that many of the adverse criticisms of the ligature operation could be traced to disregard of certain apparently minor points of detail in the technique or, as suggested by Allingham, to negligence in the after-treatment. Success, so far as applies to the ultimate result, may be confidently anticipated regardless of such considerations as the amount of postoperative pain and the time required for recovery. But when several surgical procedures, equally successful in the sense referred to, are contrasted, the latter considerations cannot be ignored. With reference to the ligature operation the following points are worthy of emphasis in this connection:—

1. The ligature material should be of soft twisted silk or linen, and of only sufficient size to afford the requisite tensile strength.
2. The knot should always be made upon the sound mucosa on the proximal side of the tumor pedicle, thus removing a source of possible irritation from the more sensitive area below.
3. The ligature should be tied sufficiently tightly to absolutely occlude the circulation. In this way the pedicle is reduced in size and early separation of the slough hastened.

4. Nothing is gained by leaving the ligatures protruding from the anus. This is particularly to be avoided when the dissection involves the skin surface, as they constitute an unnecessary source of irritation in such cases.

5. Unless there is some definite reason demanding it the sphincters should not be divulsed when the hemorrhoids are accessible without it.

6. The anal canal should be left approximately free of foreign material. The gauze packing so frequently used is not only superfluous, but is also the cause of much suffering. A single narrow strip, well lubricated, meets every indication and does not act as an irritant. This should be withdrawn after the first day.

7. The bowels should be moved much earlier than was formerly the

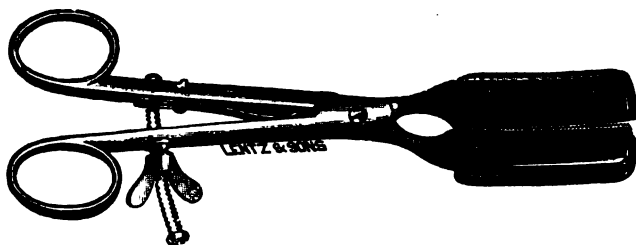


Fig. 116.—Smith's clamp.

custom, and the after-treatment of every case should have painstaking supervision.

10. The Clamp and Cautery Operation.—The pioneer names connected with this operation are those of Cussack, Lee, and Henry Smith. It is often referred to in current literature as Smith's operation for the reason that the technique as perfected and described by him in 1861 is accepted and practised today without material modification.

This is the only rival in popularity of the ligature method. During the last two decades it has made rapid strides in professional favor and today is undeniably the method of choice with the great majority of hospital surgeons. Operators who have familiarized themselves with the technique of the clamp and cautery operation are emphatic in their claims of its many advantages, while those who criticize it most vehemently probably do so largely on theoretical grounds. It cannot be successfully maintained, for example, that in the hands of the skilled surgeon the danger of hemorrhage is materially greater or the after-pain more excessive when this method is used than in the ligature operation. But there are several points of disadvantage, so far at least as regards its adaptability for general use, which are inherent in the method, namely,

the special instruments it requires and the training and dexterity necessary for their proper use.

The salient feature of all methods lies in their provisions for hemostasis. The clamp and cautery operation meets this indication by the combined expedients of crushing the base of the pile tumor and searing the stump with the actual cautery after its amputation. For the first named purpose a *strong clamp* of special design is required. Many

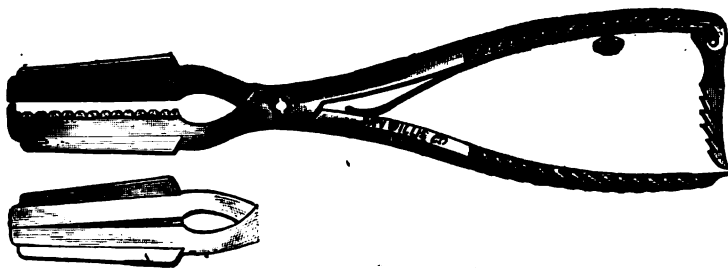


Fig. 117.—Brick's clamp.

varieties of this instrument have been devised, all embodying the same principle (Figs. 116, 117, and 118). Gant's clamp is especially notable in that the blades close throughout in an accurately parallel manner, though it is rather unwieldy in practical use.

The *cautery* may be of several kinds. The Paquelin thermocautery (Fig. 119) is a familiar and entirely satisfactory apparatus when in good working order. It has the advantage of being easily portable and so avail-

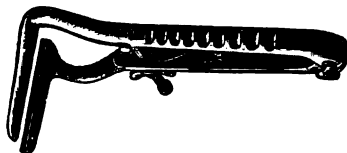


Fig. 118.—Gant's pile-clamp.

able for use under all circumstances. The electric cautery in its present perfected form is also quite satisfactory, but is even more likely to be out of order when needed. Ordinary soldering irons heated over an alcohol lamp or a gas burner answer every purpose; in fact, for universal applicability as well as efficiency, this is regarded by some operators as the best form of cautery (Fig. 120).

The preparation of the patient and the preliminary steps of the technique are the same in this as in the ligature operation. General anesthesia is always necessary when the clamp and cautery are to be used.

With the patient retained in the lithotomy position, the tumor to be removed is lifted up with a pair of forceps and the clamp adjusted to its base in a direction parallel with the long axis of the bowel. The clamp is then tightened, the overlying portion of the tumor cut off, and the cautery at a dull red heat applied to the stump until it is completely



Fig. 119.—Paquelin thermocautery.

charred throughout. The clamp should be loosened slowly and carefully to make sure that all bleeding is controlled. If this is not the case it should be again tightened and the cautery reapplied. When a hemorrhoid of the externointernal variety is to be removed a preliminary dissection should be made as described for the ligature operation and the clamp adjusted to the part of the pedicle corresponding with the internal



Fig. 120.—Soldering iron for cauterizing.

portion of the tumor. Under no circumstances should the cautery be applied to skin or mucocutaneous tissue as the pain following is certain to be excessive and prolonged. By depressing the handle of the clamp sufficiently the tip of the blades may readily be made to project from the anus and the whole procedure be conducted as though upon the surface of the body. When all the tumors have been removed the parts should be irrigated and dressed as heretofore described under the ligature operation. The after-treatment in the two methods is in every way identical.

11. The Clamp and Suture Operation.—This method has been described many times,—by whom first is uncertain. It differs in principle from the method last discussed only in the one point that sutures are substituted for the cautery as a means of permanent hemostasis. That they are more dependable for the purpose can hardly be questioned, and when all is said, this remains the vital consideration in all operations upon internal hemorrhoids.

Theoretically, the suture operation is open to criticism on the ground that, since perfect asepsis in this region is virtually impossible of attainment, there is always danger of carrying infection into the tissues in introducing the sutures. Practically, with the degree of painstaking antisepsis and asepsis justly regarded as essential in all modern surgery, this criticism proves to be without foundation. There is no good

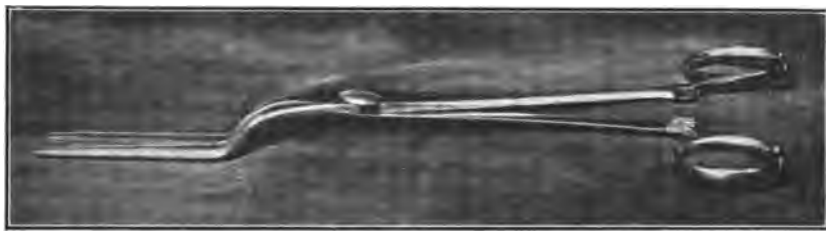


Fig. 121.—Author's clamp. (Clamp and suture operation.)

reason why the mucosa of the hemorrhoidal area cannot be as effectively cleansed for suturing as a skin area of corresponding size, and in the absence of active inflammation it is being daily demonstrated that there is little cause for apprehension on this score.

The technique of the clamp and suture operation is as follows: The patient having been prepared as for the ligature or clamp and cautery operation, is retained in the lithotomy position and, if necessary, the sphincter stretched sufficiently to bring all the tumors into view. A strong clamp with narrow tapering blades is applied to the first hemorrhoid to be removed in a direction parallel with the long axis of the intestine and so that its smaller, or free, extremity engages the upper, or proximal, portion of the tumor. By depressing the handle of the clamp the end of the blades where the suturing is to begin is readily exposed. A No. 1 or 2 chromicised catgut suture threaded on a round, half-curved needle, is passed beneath the tip of the clamp and securely tied on the sound mucosa above the base of the tumor. This is the most important step of the operation, as, if properly executed, the blood-supply of the tumor being dealt with is at once effectively controlled. With scalpel or scissors

the portion of the tumor outside of the grasp of the clamp is amputated and a continuous suture inserted, passing alternately over and under the clamp blades until the entire base of the tumor has been traversed. The clamp is then gently loosened and withdrawn and the suture carefully and uniformly tightened and secured at the skin margin. Each pile tumor in turn is dealt with in a similar manner. If one or more of the growths is of the externointernal variety, the clamp should be so adjusted as to include as much of the anal margin as may be indicated at each application. In order to avoid the possibility of the stump slipping from the grasp of the clamp, it is best to amputate the overlying portion of the tumor by degrees, following the knife or scissors closely with the sutures. As a rule the sutures should be placed about one-eighth inch apart, though when the first one is properly placed the danger of hemorrhage is practi-

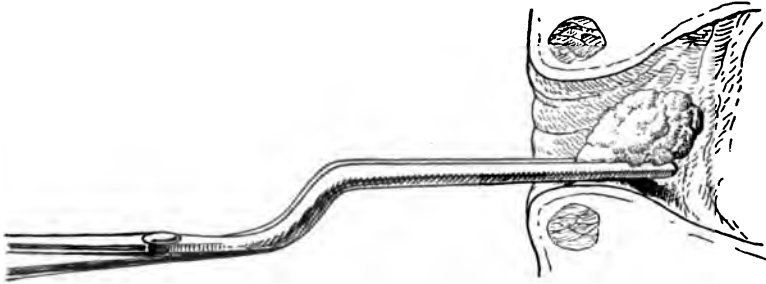


Fig. 122.—Clamp in position.

cally eliminated, and approximation of the edges of the mucosa is the chief purpose of the remainder. The tightening of the suture is greatly facilitated by leaving it slack over the clamps as it is inserted.

This method lends itself to local as well as general anesthesia, though in the former case rapid work is much more essential, particularly if multiple tumors are to be removed. The operation can be performed very quickly with a little experience, the amount of time required in a given case depending, of course, to a great extent upon the number of tumors to be dealt with.

The clamp illustrated (Fig. 121) will be found of decided advantage in performing this operation. It is merely a modification of the original pattern of Earle's clamp (Figs. 122, 123, and 124).

The author's personal experience with this method has been highly satisfactory. Considered in comparison with the other methods in common use, it conforms more nearly to the recognized principles of surgical technique than any other with the exception of the clamp and cautery. That it has the advantage of greater security than the latter

seems clear; and its relative simplicity is an additional weighty consideration in its favor. As between the two, the clamp and suture method seems on the whole the more nearly ideal.

COMPLICATIONS AND SEQUELÆ.

While it is true that the operative treatment of internal hemorrhoids is more uniformly successful than that of any other surgical malady of equal importance, the possibility of the occurrence of certain accidents and complications should not be ignored. No method is entirely exempt from these; but the careful operator who regards the minor points of

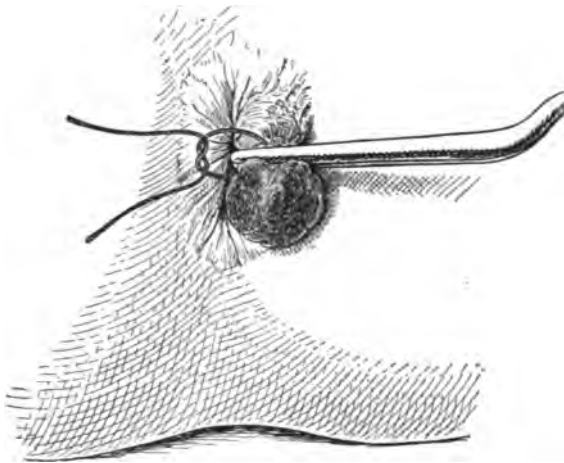


Fig. 123.—First suture.

technique and the details of after-treatment will find them reduced to a minimum in his hands, whatever the method he employs.

Pain.—It is necessary to recognize that postoperative pain is largely a matter of personal equation. Certain patients of nervous temperament appear to suffer acutely after even trivial operations, whereas others of phlegmatic type will often make little or no complaint after the most extensive surgery.

A favorite argument advanced by the champions of each of the different methods in proof of its superiority is its comparative painlessness, and always ample confirmation is available to support the several claims. On this point, it is the author's deliberate conclusion that, if the proper technique of the various methods is employed, there is little choice between them. Especial reference to the ligature, the clamp and cautery, and the clamp and suture methods is here intended. Those

who perform the ligature operation without the preliminary dissection, or insist upon stuffing the anal canal with a mass of gauze may expect to have their patients complain long and vigorously. Likewise those who apply the clamp to the anal skin and then proceed to burn it with the cautery iron, will naturally conclude that this is the most painful of all methods. But in a series of cases in which the points which experience has proved to make for comfort are carefully observed, it will be found that difference either in the amount or the duration of the after-pain is in reality inconsiderable.

The author has demonstrated to his complete satisfaction that the two most active factors in the production and maintenance of post-

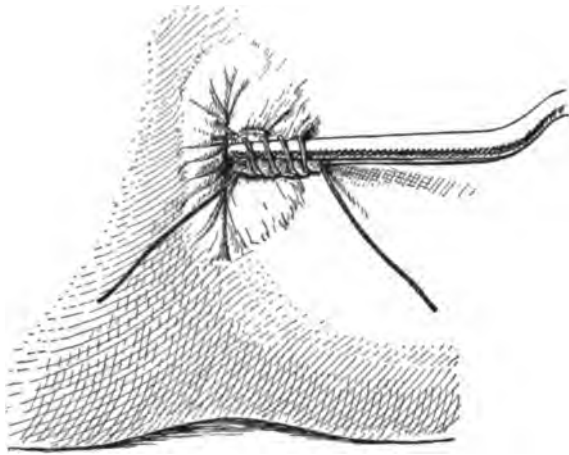


Fig. 124.—Suturing completed.

operative pain are the traumatism incident to the routine divulsion of the sphincters, and the custom of packing the anal canal with gauze. The former practice is now resorted to only when necessary and to a sufficient extent to gain access to the parts; the latter has been practically abandoned. Under these circumstances pain is not a conspicuous feature following any of the three methods last described. The initial hypodermic of morphine may have to be supplemented by one or two $\frac{1}{8}$ -grain doses during the first twelve hours; but thereafter the average patient is, and remains, comfortable. There is little difference in this respect between the ligature and clamp and cautery operations, though enthusiasm for the latter method leads certain authors to make the extravagant assertion that the pain following the ligature method usually persists for days. The clamp and suture method is marked by less after-pain, as a rule, than either of the others.

A distressing complication frequently observed after operation is the spasmodic contractions of the anus which occur during the first twenty-four or forty eight hours. This is very probably brought about by the action of the levator ani muscles and, like the pain already referred to, is most apt to be noted in those cases in which divulsion has been practised, or foreign material left in the anal canal. It is occasionally so severe and recurs at such short intervals that the patient is utterly unable to sleep even when opiates are administered. Hot applications locally sometimes give great relief. Fortunately the trouble is usually of brief duration.

A most efficient means of minimizing postoperative pain consists in infiltrating the entire field with a weak solution of quinine and urea hydrochloride ($\frac{1}{4}$ to $\frac{1}{2}$ of 1 per cent.) before applying the dressings. The anesthetic effect of this agent persists for several days, and the author has demonstrated in many cases that its proper use is capable of rendering the whole postoperative period practically free from pain. It may be employed with equal success after any method of operating.

Hemorrhage.—Hemorrhage incident to hemorrhoidal operations may be either primary or secondary. With the resources of modern surgical technique available, the danger of primary hemorrhage is negligible. Even in the Whitehead operation the loss of blood can be kept within safe limits by the dextrous operator.

Secondary hemorrhage, though rare, may follow any method of operating. While it is due in the majority of cases to carelessness or other fault in the operator, it is well to bear in mind that certain constitutional conditions or diseases of the patient render it particularly liable to occur. As between the several more popular methods, it is conceivable that a ligature may slip, but it is much easier to conceive of the possibility of a protecting crust of burnt tissue giving away, under the stress of postoperative reaction and muscular contractions. The total number of cases of secondary hemorrhage on record is strikingly small. One should, however, be on the alert to recognize the symptoms of this accident early, and lose no time in adopting the proper remedy. To use astringent injections is generally to waste valuable time, and the expedient of packing the rectum is painful, difficult, and uncertain. It is far better to at once meet the indications boldly by administering an anesthetic and ligating the bleeding vessels.

Retention of Urine.—This complication is met with after all methods of operating. It may be either a strictly reflex phenomenon, or due to traumatism of the levator ani muscles inflicted in the preliminary overdivulsion so frequently practised. In the former case the presence of a foreign body (*c.g.*, gauze packing) in the anal canal is the

most usual exciting cause of the reflex irritation. Those who most nearly eliminate these two factors in their operative work will have the fewest number of instances of this complication to deal with.

It is always unfortunate to have to resort to the use of the catheter in these cases and it should not be done upon slight provocation. Once used, the catheter is quite certain to be required for several days at least, and, if the danger of infection is escaped, a certain amount of urethral and vesical irritation, sometimes persisting for months, is the inevitable result. The truth is that with proper management catheterization is not often necessary. The bladder should invariably be emptied immediately before the operation and the smallest possible quantity of fluid allowed during the succeeding twenty-four hours. The patient should be advised not to attempt to micturate for at least twelve hours, even though the inclination is felt. The effort is much more certain to prove successful if the natural position is assumed and this may usually be safely permitted after the time mentioned. Should the effort fail, hot stupes applied over the pubis and genitals, or a hot sitz bath will often prove effective. When resort to the catheter becomes necessary of course the strictest aseptic precautions should be observed.

The question of the relative frequency of retention following the several methods is not of material importance. Results with a given method naturally vary to some extent in the hands of different operators. It is surprising, however, that one of the skill and experience of Tuttle should say:⁷ "Strangury and dysuria are almost inseparable from the ligature operation. The writer does not remember a single case where this method was used in which it was not necessary to catheterize the patient for some days or even weeks afterwards." Such has certainly never been the experience of this writer. In fact, at the present time when this method is employed the occasion calling for the use of the catheter is a rare exception. The clamp and cautery operation under similar conditions probably gives rise to trouble in this regard fully as often as the ligature operation. Properly employed and wisely managed afterward, the cases requiring catheterization should be very few after either method.

Infection.—The most remarkable fact connected with the surgery of the rectum is that infection so rarely occurs. This is particularly true of the ligature operation for internal hemorrhoids in which the open wounds and sloughing stumps seem actually to invite bacterial invasion. In the light of clinical experience, however, it may be confidently asserted that septic infection is not more frequent in this than in other methods

⁷ *Op. cit.*, pp. 661 and 662.

of operating. In the several hundreds of operations which the author has performed by the ligature method, no instance of this complication has been observed.

Formerly tetanus was the cause of a number of deaths following hemorrhoid operations, but almost without exception these cases occurred in general hospitals in which the disease was already prevalent. Since the days of antiseptic surgery only isolated instances have been recorded. Erysipelatous infection has also been reported, usually under similar conditions.

Abscess and fistula and chronic ulceration are the complications due to infection which have been most frequently reported. It is altogether probable that some condition apart from the operation itself is responsible for these complications, otherwise they would certainly occur in a much larger proportion of cases. The injury resulting from divulsion of the sphincters is doubtless the true explanation in many cases. It is not unreasonable to assume that the formation of a hematoma in the perirectal tissues, or a laceration involving the fibers of the sphincter muscle which later becomes infected, occurs at least as frequently as does abscess in these cases. Chronic ulceration is most likely due to constitutional causes in the rare cases in which it occurs.

These several complications are to be managed according to the principles already laid down. If due care with reference to antisepsis is exercised in every case there will be little to fear from infection in hemorrhoid operations.

Stricture.—Stricture as a sequela of hemorrhoid operations is most likely to occur either at the anal orifice involving the skin only, or at the proximal end of the anal canal involving the mucosa only. In the former case it is practically always due to recklessness in the dissection of the anal skin, and failure to adopt the proper steps in the after-treatment to prevent vicious cicatrization. In the latter event the contraction results from including too much of the mucosa in the grasp of clamp or ligature, and neglect of the precaution of passing the finger into the bowel when the operation is completed. It may also be due to contraction in healing of the chronic ulcerations which occasionally result from operation.

Cicatricial narrowing of the anal opening may be obviated even in the most exaggerated cases of externointernal hemorrhoids by making the dissection so as to leave definite areas of skin intact between the tumors, or, where this is impossible, taking steps early to prevent contraction. When the stenosis has occurred it may usually be corrected by making an incision, bilaterally if necessary, entirely through the cicatrix and keeping it open by packing the wound tightly throughout the

healing process. It is better for the patient to undergo the temporary discomfort incident to the postoperative inflammation of one or more skin tags than for the operator to strive too zealously for cosmetic effect and have an anal stricture result.

A stricture involving the mucosa only is readily relieved by incising it at several points *down to* the bowel wall and passing a bougie daily until the wounds heal. No patient should be dismissed until the surgeon has convinced himself by digital examination that there is no tendency to contraction at any point. A good rule is to insist that all patients return for observation a month or so after their discharge, whether or not they have noted symptoms referable to the parts.

CHOICE OF OPERATION.

When the arguments *pro* and *con* with reference to the various operations have been duly considered, it remains for the average operator to select the method best adapted to his individual needs, and having selected, to become as proficient as possible in its use by employing it in all suitable cases, instead of trying first one and then another. In making the choice, the circumstances of his location and his own fitness and training for surgical work should be the determining factors. A method entirely suited to the surgeon operating daily in a well-equipped hospital may be ill adapted to the needs of one who operates only occasionally, and then, perforce, in the patient's home and without trained assistants. For the latter class the author is strongly of the opinion that the ligature operation offers many advantages. It can be applied to practically any case; the technique is simple and easily acquired; it is safe; and the end results are uniformly satisfactory to all concerned.

CHAPTER XVI.

Prolapsus.

THE term prolapsus ani, formerly in common use, is obviously an incorrect designation, since it properly includes only one of the several varieties of the affection. As between the terms *prolapsus* and *proci-dentia* there is little choice in spite of the attempt of certain authorities to invest them with purely arbitrary distinctions. Both words have the same meaning and it seems best to employ them as in every sense interchangeable.

Definition.—*Prolapsus, or procidentia recti, is that condition in which there is an abnormal descent of one portion of the rectum or anal canal into or through a lower portion. The prolapsed portion may or may not appear externally. In the latter event the condition is always one of invagination as well as prolapsus.*

Strictly accurate classification of the subject is not a simple matter. To avoid confusion the two time-honored divisions, *partial* (incomplete) and *complete*, are best retained, it being remembered that the terms refer to the coats of the bowel, not to its circumference. In the former only the mucosa is involved in the prolapsus; in the latter the entire thickness of the bowel is involved.

PARTIAL PROLAPSUS. •

This variety of the affection is characterized by the protrusion of the mucous membrane through the anal aperture. The abnormal mobility which renders such protrusion possible practically always includes the tissues of the anal canal, so that the designation, prolapsus ani, which is often erroneously used, may here be applied with perfect propriety in the majority of cases. The whole or any portion of the circumference of the gut may be involved. When the trouble occurs independently of the dragging action of polypi and internal hemorrhoids, the entire bowel is apt to present a more or less uniform involvement (Fig. 125).

Children are much more frequently affected than adults. It is often met with in very young infants; and the aged, in whom absorption of fat and relaxation of the parts has occurred, are also frequent victims.

Partial prolapse is far more common than the complete variety. It may undoubtedly exist in minor degree without serious inconvenience to

the patient. In fact, some eversion of the mucosa in the act of defecation is more or less physiological. This constitutes a familiar phenomenon in certain of the lower animals, notably the horse, in which the arrangement of the muscular coat of the bowel at its terminus is designed to cause extrusion of several inches of the mucosa.

Etiology.—The causes of partial or incomplete prolapse are predisposing and exciting. Among the former are included: (1) Age. In infants the curve of the sacrum is much less developed than in adults and in consequence the expulsive force in defecation is applied more nearly in a straight line with the outlet of the bowel. In the aged muscular tonicity is often defective and a relaxed and weakened con-

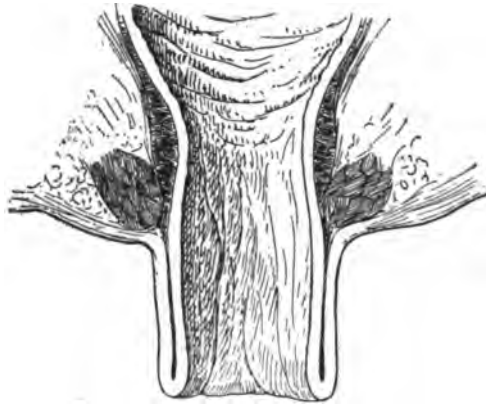


Fig. 125.—Partial prolapsus.

dition of the sphincters impairs the normal support. (2) Prolonged constitutional diseases which result in enfeeblement and emaciation. (3) Certain diseases and injuries of the spinal cord resulting in interference with the nerve-supply of the parts. (4) Accidents or faulty operations by which the sphincter muscles are permanently injured, so that the power of contraction is lost or greatly impaired. In fact, relaxation or weakening of the sphincter, however brought about, must be reckoned one of the most important predisposing causes. (5) The presence of polypi or internal hemorrhoids which may act mechanically in producing eversion of the mucosa.

At the head of the *exciting* causes stands straining at stool. Indeed, whatever may be the occasion of the straining, this is practically always the means by which the pathologic condition is brought about. In the nature of the case the prolapsus occurs gradually, from many repetitions of the exciting cause. While a sudden onset of the trouble may be

possible, it is highly probable that the instances so reported developed slowly, escaping observation until the prolapsed mucosa failed to return spontaneously, or until increasing local discomfort attracted the patient's attention to the parts.

Any causes which produce straining at stool are, therefore, to be regarded as exciting causes. These are very numerous. In infants and young children in whom the susceptibility is more marked, pin worms, polypi, phimosis, stone in the bladder, whooping-cough, chronic diarrhea, and proctitis from any cause, are the etiologic factors most frequently observed. The natural tendency to the trouble is often encouraged in these little patients by the pernicious practice of mother or nurse of forcing them to retain the attitude of defecation for prolonged periods daily in the effort to "train" them.

Among older people the same causes may be operative and such additional ones as urethritis, stricture, enlarged prostate, ulceration or stricture of the rectum, the presence of foreign bodies, pressure by extrarectal growths, etc.

Pathology.—In the incipency of this variety there is merely a laxness and redundancy of the mucosa, without noticeable pathologic change. Gradually, as the result of mechanical irritation from pressure of the sphincter and repeated handling, inflammation and thickening occur; the epithelial coat is destroyed, and a spongy, congested appearance is assumed, with a tendency to bleed at the slightest touch. Sometimes the prolapsed mucosa becomes infected, with the production of ulceration and submucous abscess and fistula. When strangulation occurs there may be more or less extensive sloughing of the parts.

Symptoms and Diagnosis.—The onset of incomplete prolapsus is practically always gradual, beginning as a slightly exaggerated eversion of the mucosa at defecation, which recedes spontaneously when the expulsive effort ceases. At this stage there are usually no appreciable symptoms. But as the extent of the prolapse increases and the mechanical irritation of the up and down movement is repeated from day to day, the mucosa becomes chronically congested and thickened and the patient's attention is attracted to the parts. At first the sensation is one of discomfort rather than pain; there is a feeling of fullness and, perhaps, a slight burning or sense of irritation about the region. Soon a profuse catarrhal discharge, often blood-stained, appears and an annoying pruritus may develop. Pain is rarely severe unless ulceration or strangulation occurs, though the prolapsed mucosa may be extremely sensitive to touch.

The prolapsus may involve the whole or only a portion of the circumference of the bowel. In the former case it presents furrows or

sulci radiating from the central aperture; in the latter, merely a thickened fold of mucosa differing from the normal chiefly in the matter of protrusion.

At first the prolapsus in appearance deviates little from the normal mucosa. Later it assumes a congested, dusky hue, or it may be roughened and spongy. When strangulated it may vary from a dark red to a pronounced purplish color, according to the degree of obstruction of the circulation.

Many long-standing cases of internal hemorrhoids are complicated by prolapse of the intervening mucosa along with the pile tumors. The latter are much darker in color and firmer in consistence than the mucous membrane between them. The differentiation should be carefully made when a surgical operation is to be undertaken.

An incomplete prolapsus is readily distinguished from the complete variety by the fact that in the former the sulci radiate from the center, whereas in the latter they are concentrically placed around the cone-shaped mass. The incomplete variety is smaller in size, rarely projecting more than two inches, while the complete variety is always much larger and may assume enormous proportions.

Treatment.—Often the first service required of the surgeon when a case of this kind comes under his observation will be *the reduction* of the prolapse. When the condition has existed for any considerable length of time, particularly after it has been subjected to prolonged manipulation by the mother or attendant, the undertaking may prove quite difficult. It is rarely necessary to resort to an anesthetic for the purpose, however, if the proper measures are employed. The parts will usually be found irritated and sensitive, and in very young patients even the gentlest handling will provoke struggling and straining. Whatever measures are adopted should be applied with firmness and decision. The prolapsed bowel should be bathed with cold water and anointed with a bland oil, and, with the child retained in the prone position, steady pressure made with a soft compress against the protruded mass. Should this fail, complete inversion of the patient will sometimes facilitate the reduction.

A valuable expedient in difficult cases consists in the use of a cone of toilet paper placed over the well-lubricated index finger which is then introduced into the aperture and pushed up into the bowel carrying the prolapsus with it. The finger is then withdrawn leaving the paper cone in place to come away at the next evacuation. It is important to bear in mind that the most prominent portion of the protrusion is the portion to be first returned, otherwise much unnecessary effort is likely to be wasted. It is also important to remember that bruising of the parts is

to be carefully avoided, if the future conduct of the case would be simplified.

When all efforts at reduction fail an anesthetic should be administered, the sphincter divulsed and the protruded mucosa replaced, or the radical operation at once performed.

When the reduction has been effected the first indication of treatment is to adopt the proper measures to prevent recurrence of the condition. Chief among these measures is the removal of the cause. Any source of irritation in the rectum or neighboring organs which might provoke straining at stool must be carefully sought for and eliminated. In very young patients constipation and diarrhea are equally potent for harm. Occasionally nothing can be accomplished until a chronic cough has been relieved.

Under palliative treatment a great many measures have been recommended. A variety of trusses designed to support the parts and prevent protrusion have been described, but it is probable that additional irritation is the only effect to be expected from the use of any of them. The stools should be kept in a soluble condition so that defecation will not call for violent muscular effort. Cold and astringent enemas of moderate quantity may be administered after each stool. If possible, the recumbent posture should be maintained during the act of defecation, and a compress applied to the anus or the buttocks strapped together with adhesive plaster before the patient is permitted to resume play. The diet should be carefully supervised and the general condition of the patient receive appropriate attention. Tonics, such as iron, phosphorus, arsenic, strychnia, and codliver oil, in carefully regulated dosage, often serve a most useful purpose in building up the general health and restoring tone in the relaxed muscular structures. The great majority of cases occurring in young children are capable of being permanently relieved by faithful and intelligent palliative treatment.

Active measures of treatment directed to the local condition are best classed as surgical. This is the kind of treatment which will be found necessary in the larger proportion of cases affecting adults, in order to accomplish a permanent cure.

The use of chemical caustics (fuming nitric acid) as recommended by Allingham and the application of the actual cautery as advocated by Van Buren are the only non-operative measures of this class worthy of consideration. The injection method of treatment is not applicable to the variety of the malady now under discussion.

Allingham regarded the free application of fuming nitric acid to the prolapsed mucosa as a most reliable means of cure. He recom-

mended that, after thorough drying, the acid be applied to the surface of the entire protruded mass, care being taken to protect the skin of the anal verge. Any excess of acid is wiped away, the parts lubricated

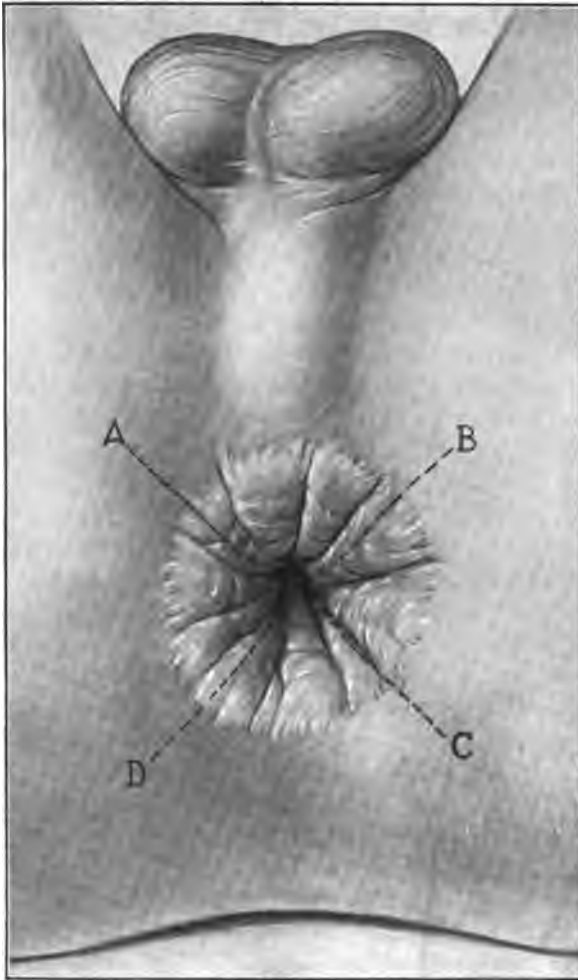


Fig. 126.—Linear cauterization for partial prolapsus.

and the prolapsus at once reduced. There can be no question that this method of treatment has proved effective in many cases; but its disadvantages are so numerous and patent that it is seldom resorted to at the present day. If the nitric acid is employed at all it is much better to follow the suggestion of Gant and apply it by means of a

glass rod at several separate points around the circumference of the gut. By this means the extent of the resultant sloughing is limited and the danger of stricture practically eliminated.

The method of linear cauterization first described by Van Buren is by far the best of the non-cutting methods of treatment. It consists in drawing lines with the point of the actual cautery heated to a dull red at several different sites of the mucous membrane, beginning above the prolapse and extending them downward parallel with each other on to the skin of the anus. In this way cicatrices are formed which bind the mucosa firmly to the muscular coat, and at the same time the patulous anus is narrowed. The number of applications of the cautery is determined by the extent and duration of the condition. Ordinarily four lines of cauterization will be sufficient, provided they are made sufficiently deeply (Fig. 126). If necessary, the treatment may be supplemented at a subsequent time, and it is better to take this chance than to run the risk of producing too great a degree of contraction, thus rendering necessary an operation for stricture of the anus at a later date.

The Paquelin thermocautery offers the most convenient means of applying this treatment, though an ordinary soldering iron of small size heated over a gas burner answers every purpose. The amount of inflammatory reaction following the cauterization varies. Ordinarily an opiate will be required during the first twenty-four hours. The bowels should be confined for three or four days and thereafter moved daily with enemas. Healing of the raw surfaces left by separation of the sloughs may be promoted by touching them occasionally with a 2 to 4 per cent. solution of nitrate of silver. The patient's comfort is greatly enhanced by daily injections of an ounce of carbolized olive oil (1 per cent.). Complete healing may be expected in two weeks, and, if the causes which underlie the condition have been previously removed, permanent cure may be reasonably certain.

The operative measures available for the treatment of incomplete prolapsus are the same as those described in the preceding chapter for the treatment of internal hemorrhoids. As heretofore noted, the two conditions frequently coexist, and any one of the several standard methods of operating upon the latter will generally result in the cure of both. When the prolapsus exists alone the ligature operation may be utilized by catching up the prolapsed mucosa and tying it off in segments, being careful to leave a zone of normal tissue between the ligatures. Separation of the ligatures may be hastened by a judicious preliminary dissection of the base of the segments to be removed, as in the case of internal hemorrhoids.

The clamp and cautery may be utilized for the same purpose. The superfluous mucosa may usually be disposed of by application of the clamp at four equidistant points. To obviate the danger of too great contraction it is important that the clamp be applied longitudinally, leaving intervening strips of sound mucosa. This constitutes an ideal method of operating when primary union is secured (Fig. 127).

Operation by the Whitehead method is also available in this con-

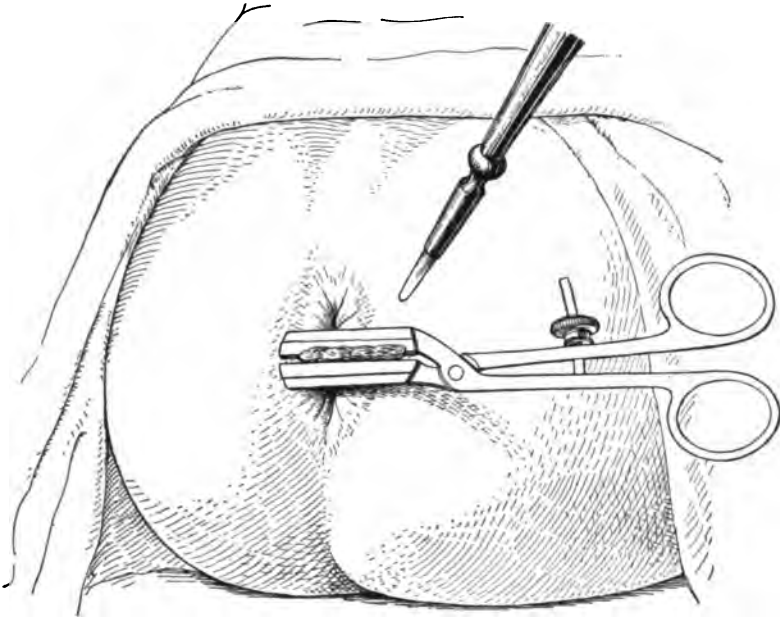


Fig. 127.—Clamp and cautery.

dition. Theoretically this technique would seem to meet the indications perfectly. The same disadvantages and dangers obtain, however, as in the case of internal hemorrhoids, with the difference that its peculiar adaptability to the conditions presented in prolapsus, to a greater degree justify its employment.

The several measures designed to secure contraction of the anal opening, *e.g.*, subcutaneous circular suture, do not call for consideration with reference to incomplete prolapsus. These will be described in the discussion of the complete variety. The methods above alluded to of removing the redundant mucosa in the incomplete variety are so safe and effective that, particularly in adults, it is a waste of time to resort to non-surgical methods of treatment.

COMPLETE PROLAPSUS.

When all the coats of the bowel descend from their normal relations the condition is one of complete prolapsus. This variety of the trouble is far more serious than the one just described. In addition to the more or less complete invalidism which it induces, life-endangering complications are liable to develop in certain types of cases.

Three forms, or degrees, of complete prolapsus are usually described:—

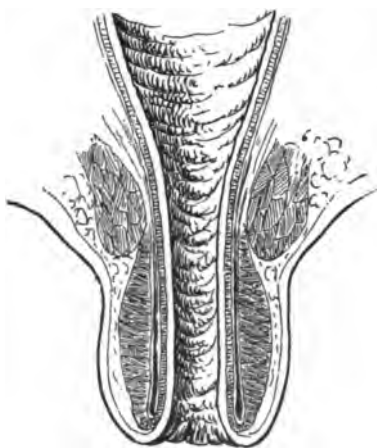


Fig. 128.—Complete prolapsus, first degree.

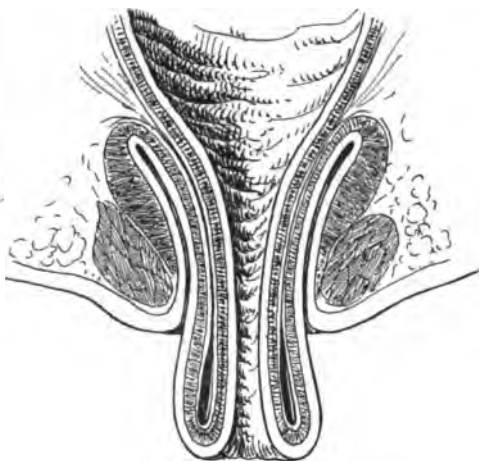


Fig. 129.—Complete prolapsus, second degree.

First Degree, in which the protruded mass is continuous externally with the skin of the perianal region (Fig. 128).

Second Degree, in which the protruded mass originates at a higher portion of the gut and is invaginated through the anal canal the walls of which are not implicated (Fig. 129) and

Third Degree, in which there is an invagination of some portion of the colon into the rectum, the descending segment not appearing at the anus (Fig. 130). In connection with this variety there may be a true hernia of other viscera into the cavity of the rectum, the cecum, coils of small intestine, omentum, urinary bladder, etc., having been found in the invaginated mass. When this occurs the anterior wall of the movable rectum forms the sac of the hernia (Fig. 131).

The complete variety of prolapsus is found more frequently in adults than the incomplete variety. The aged and those whose muscular tone has been weakened by paralytic strokes or exhausting

PLATE XVI.



Complete prolapsus, second degree. Treated by sigmoidopexy and linear cauterization of anal canal, with perfect and permanent cure. (Author's case.)

PLATE XVII.



Prolapse, second degree, 17 inches long. Absolute absence of muscular and fascial support. (*Collier F. Martin.*)



Prolapse, second degree. Same case, showing relaxed or absent sphincters after prolapse is replaced. (*Collier F. Martin.*)

diseases are most liable to the malady. Men are more often affected than women.

The frequency with which prolapsus is associated with defective mentality is worthy of comment in passing. This is particularly notable in children, *e.g.*, cretins, in whom the complete variety is not infrequently encountered. The exact relation is not apparent, but remarkable improvement in the intelligence of such patients has often been observed to follow relief of the rectal pathology.

Complete prolapsus of the first degree is usually merely an



Fig. 130.—Complete prolapsus, third degree.

extension of the pathologic process which first manifests itself in the incomplete form. Continuation of the constipation or other morbid condition which induces straining at stool finally results in the entire bowel becoming sufficiently loosened from its attachments to descend through the anus. This is not true of the second and third degree varieties, in which the structures of the anal canal are in no wise involved in the procidentia. The existence of a sulcus between the anus and the protruded mass is always a ready and reliable means of differentiating the first variety from the other two.

In size the complete prolapsus is naturally much larger than the incomplete variety. Occasionally it assumes enormous proportions, projecting six or more inches from the anus and being as large as a fetal head in circumference. The surface of the protruded mass presents circular corrugations, or concentric furrows, of the mucosa with

the aperture leading into the bowel at or near the apex. When the protrusion is of large size the tip is likely to be drawn backward on account of the more inelastic posterior attachments of the rectum. Sometimes, for the same reason, the prolapsed bowel will assume a curved shape with the concavity directed toward the coccyx.

The color of the prolapsed bowel varies under different circumstances. Immediately after protrusion it presents much the same appearance as the normal mucosa. When allowed to remain down, however, by reason of the congestion incident to the obstructed cir-

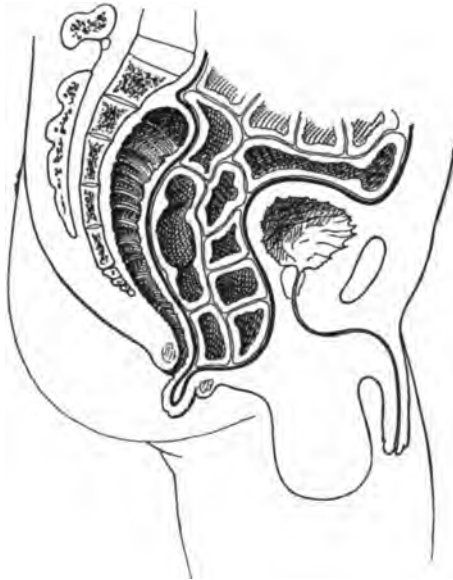


Fig. 131.—Complete prolapsus with hernia.

ulation it rapidly becomes dark red or purplish in color. If not reduced promptly, the mass may swell until partial or complete gangrene supervenes.

Pathology.—Some inflammation of the mucosa is always present in these cases, in consequence of which there is usually a copious glairy mucous discharge. This is often blood-stained and, in uncleanly individuals, is very apt to occasion an offensive odor. If the inflammation becomes severe, by reason of infection or traumatism from repeated and violent handling, ulceration and eventually sloughing may occur.

In old cases the mucosa is always thickened and is generally darker in color and spongy in appearance. In these cases the sphinc-

ters are usually considerably weakened, occasionally even to the extent of remaining patulous.

The **etiology and symptoms** of complete prolapsus are virtually the same as those of the incomplete variety. The symptoms of the third degree form are apt to be more obscure than those of the first and second degree, on account of the fact that in the former the mechanical action of the sphincter muscles is not a complicating factor. In these cases a dull aching in the back and pelvis, flatulence, mucous discharge, and obstinate constipation are oftentimes the only symptoms which can be elicited. If the patient is a woman the trouble is more than likely to be attributed to some derangement of the internal genital organs. Only a thorough, discriminating examination will clear up the diagnosis in many cases. It is doubtless true that this form of prolapsus is not infrequently overlooked.

Diagnosis.—The diagnosis of complete prolapsus of the first and second degree is a very simple matter, requiring merely inspection of the parts immediately following the act of defecation. To differentiate between these two types is also usually quite easy, it being only necessary to remember that in the first degree type the protruded mass is directly continuous on its outer aspect with the tissues of the anus, while in that of the second degree an easily determined sulcus, often of considerable depth, is present in this situation.

The diagnosis of complete prolapsus of the third degree is much more difficult. Here the subjective symptoms as a rule are vague and indefinite, and there are no reliable objective symptoms. In this case examination of the interior of the rectum is always essential. Simple introduction of the finger may be all that is required. If not, the proctoscope will reveal the presence of the invaginated bowel. When necessary to use the latter the patient should be placed upon the side instead of in the usual proctoscopic position, and directed to strain down forcibly from time to time. Several examinations may be required to determine the true nature of the trouble, on account of the tendency of the invaginated bowel to become dislodged under the manipulation incident to the use of the proctoscope.

Correct diagnosis of complete prolapsus is of far greater importance than that of the incomplete variety, because of the character of the structures involved and the much more serious nature of the treatment which may be required to effect a cure.

Treatment.—The reduction of a complete prolapse calls for skill and resourcefulness as well as the exercise of good judgment. The problem presented is often far from a simple one. When the bowel is allowed to remain in the prolapsed position it rapidly becomes swollen

and edematous. In a comparatively brief time the folds may become agglutinated by the plastic material poured out, and the entire tumor-mass firm and resistant. The next stage is strangulation, and death of the part may quickly follow. In the latter event reduction could only result in disaster.

When the case is seen early enough reduction by taxis should be attempted. The protruded mass should first be cleansed and well lubricated with a bland oil. Then, after covering it with a soft piece of linen or gauze to facilitate handling, an effort should be made to reduce its size by gently kneading and compressing it. The opening of the bowel lumen is practically always at or near the apex of the tumor, and this is the guide to the part which must be first returned. Much futile effort may be made and valuable time lost by failure to appreciate this point. With the patient in the knee-chest posture so as to favor the return of any hernial contents and gain the advantages of gravity and the traction of the abdominal viscera, pressure should be made firmly and continuously. Sometimes the finger or a soft rubber bougie introduced through the prolapsed gut into the anus may prove useful by serving as a guide in the application of the taxis. The expedient of using a piece of toilet paper as mentioned in discussing reduction of the incomplete variety (page 297) is worthy of trial.

When it becomes apparent after reasonable perseverance that reduction cannot be effected by the above plan, it is better not to inflict useless traumatism, but to administer a general anesthetic and divide or incise the sphincter and replace the parts at once. In this case it will be wise to pack the rectum with oiled gauze and adjust a firm compress in order to prevent recurrence during the ensuing period of nausea and relaxation.

When the question arises as to the viability of the prolapsed gut its correct settlement becomes the first consideration. It is imperative that any constriction existing at the anal opening be relieved by division or divulsion of the sphincter. Then, unobstructed circulation in the parts being provided for, the prolonged application of heat, preferably by means of fomentations, constitutes the best resource. Often the entire aspect of a case which at first seemed hopeless will be completely changed by persistence in the use of this measure, and an hour or more so spent may be the means of saving life. When it appears certain that the circulation cannot be restored it only remains to perform the radical operation.

It should be borne in mind that the application of ice or cold in these cases is always contraindicated on account of the already lowered vitality of the parts due to the impeded circulation. Irremediable harm may result before the danger is even recognized.

The palliative or non-operative treatment of complete prolapsus is much more likely to prove successful in children than in adults. Still, unless some urgent indication is present, it may well be given a trial in every case. When the reduction has been effected, the most important consideration is to prevent recurrence of the trouble. To this end the several suggestions set down under the palliative treatment of partial prolapsus are equally applicable here. The feces should be rendered and kept soluble, and every condition which has a tendency to excite straining at stool carefully corrected. Spraying the rectal mucosa through the proctoscope with a 1 per cent. solution of silver nitrate is one of the best means of allaying tenesmus quickly in these cases. The bowels should be evacuated in the recumbent position, a cleansing enema of cold water or a mildly astringent solution administered, and the buttocks immediately strapped together with adhesive plaster. The proper appli-

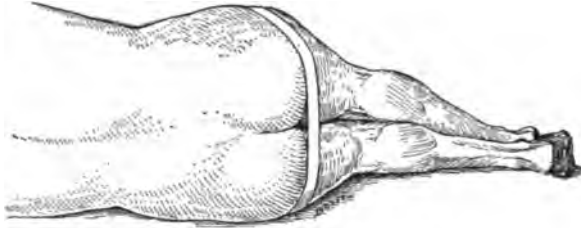


Fig. 132.—Strapping of buttocks.

cation of the adhesive straps is a matter of considerable importance. When so placed that they must be changed at every act of defecation the skin surfaces soon become tender and inflamed. This may be obviated by adjusting a single strap of suitable width so that its rear edge will lie immediately anterior to the anus, the ends of the strap extending to the great trochanter on either side (Fig. 132). In this way the support may be maintained during the act and the dressing kept comparatively clean for several days at a time.

Trusses and compresses applied over the anus with the idea of preventing recurrence of the prolapse are of little value. Constant pressure at this site, aside from the irritation it is almost certain to cause, tends to weaken the sphincter muscle, and so, ultimately, can only result in injury.

Treatment by injection of medicinal agents into and about the bowel was formerly in much favor, but has few advocates at the present time. The two remedies most frequently employed for this purpose were ergotin and strychnine. By means of long hypodermic needles introduced from the skin surface or through the bowel wall from within,

solutions of these agents were deposited in the perirectal tissues, the injections being repeated at longer or shorter intervals according to the degree of local reaction produced. It is probable that the favorable results reported from this treatment were due rather to the general tonic effect of the medicinal agents used than to any special local action. Tonics can certainly be more rationally administered, and the danger of carrying infection into the tissues is not one to be ignored. The injection of paraffin into the perirectal tissue has been advocated and practised in the treatment of this condition. The method has nothing to commend it; on the contrary, is to be unreservedly condemned. Such foreign substance placed below the level of the levator ani muscles could accomplish nothing unless injected into the walls of the bowel itself, where it would necessarily be a constant source of irritation and danger. If injected into the loose tissues above the levator, it could not possibly accomplish the end of affording mechanical support unless used in such amount as to render its presence in every way objectionable. The readiness with which infection occurs in this region positively contraindicates resort to this method of treatment.

Constitutional remedies often form an important part of palliative treatment. Where general debility, anemia, etc., are marked the appropriate remedies will be obvious. It is probable that a course of nuxvomica or strychnia will prove beneficial in the majority of cases.

The surgical treatment of complete prolapsus falls into four general classes:—

1. Narrowing of the anal outlet.
2. Shortening of the bowel (rectorrhaphy).
3. Fixation (rectopexy, sigmoidopexy).
4. Resection (amputation) of the prolapsus.

It would serve no practical or useful purpose to discuss in detail the various operations and modifications of operations which have been devised for the relief of this malady. Their number is legion. Instead, it seems best to describe only those of each class whose value is established and which represent the best of modern surgical teaching upon the subject.

1. Narrowing of the Anal Outlet.—It is very doubtful whether the surgical indications of complete procidentia are ever fully met by confining the attention to the anal region. In the majority of cases this is merely the site of egress of structures which belong above,—sometimes far above. Narrowing of the anus in many cases can have no other effect than to prevent the escape of the prolapsus, which in reality continues as before with only the immaterial and misleading difference that it is no longer visible. On the other hand, as supplemental to the more

radical procedures, it may serve a most valuable purpose. A close analogy is found in the case of prolapsus uteri. Here no surgeon would delude himself that he had done really effective work if he confined his efforts to the repair of a lacerated vaginal outlet; but would properly regard that as merely one step, albeit an important one, in the solution of the problem before him.

Narrowing of the anus, then, with reference to complete procidentia recti, is not to be considered as an accepted and definite method of

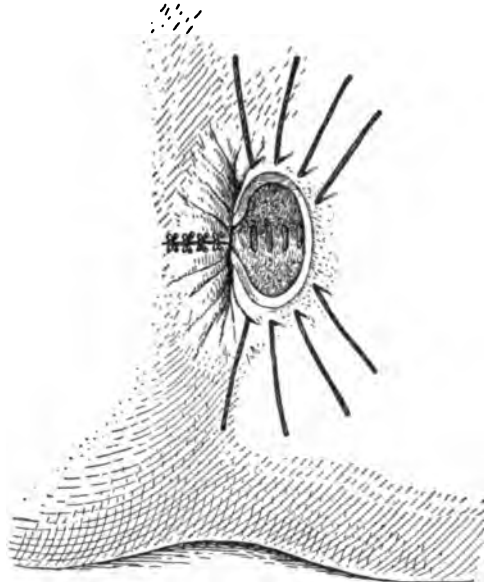


Fig. 133.—Dupuytren's method. Elliptical denudation, suture of anus.

treatment, but rather as an accessory expedient which has a place and may be employed to advantage in a certain proportion of cases.

Very different principles underlie the various methods which have been suggested for producing constriction of the anal aperture. Urbane's method consisted in introducing a purse-string suture of silver wire around the anal canal immediately beneath the mucosa at the site of the internal sphincter and allowing it to remain in place for several days. Another writer suggests that a silk suture be substituted for the silver wire; still another urges catgut as the preferable material. The objections to this method are obvious, and it need only be said in passing that it never commanded the serious attention of the profession.

Dupuytren's method consists in dissecting the mucocutaneous tissue from one or more elliptical areas at the anal outlet and drawing the edges

together with sutures. The benefit of such plastic surgery could at best only be temporary (Fig. 133).

Dieffenbach, Roberts and others modified the Dupuytren method by extending the dissection deeply into the tissues on either side of the posterior commissure so as to remove a wedge-shaped mass including the entire thickness of the sphincter muscle. The wound is accurately closed throughout with sutures, a material narrowing of the anus necessarily resulting. Success with this operation would depend absolutely upon the securing of primary union. Should infection occur, an accident always to be apprehended when plastic work is attempted in this region, decided aggravation of the original trouble would be inevitable.

Lange's operation contemplates the narrowing of the lower end of the rectum as well as the anal canal. Through a posterior median incision extending from anus to coccyx, the latter being removed if necessary, the attachment of the levator ani is dissected loose for an inch on either side and the posterior wall of the rectum freely exposed. A series of transverse sutures is so placed that, when tied, the bowel will be folded inward in a longitudinal direction, thus narrowing its lumen and materially stiffening it (Fig. 134). The cut edges of the levator are then carefully reattached to the bowel and the incision closed. In selected cases in which the prolapsus involves only the lowest portion of the rectum, it would appear that this procedure should prove permanently curative.

Van Buren's method of linear cauterization, however, offers at once the simplest and most effective means of narrowing the distal end of the bowel. This method is fully described in an earlier portion of this chapter under the treatment of incomplete prolapsus (page 300). The majority of all cases of complete prolapsus of the first degree are probably amenable to this treatment, and very many of those of the second degree also. In the latter class it is necessary to extend the lines of cauterization well up into the cavity of the rectum, taking special care not to burn too deeply on the anterior wall for fear of exciting peritonitis. The active inflammation and resulting adhesions following the application of the cautery serve to fix and retain the gut in its normal position. The treatment may require one or more repetitions at intervals of several weeks, according to the extent of the case.

2. Shortening of the Bowel (Rectorrhaphy).—A number of plans, differing both in principle and in mode of procedure, have been suggested for shortening the bowel with a view to overcoming complete prolapsus. These may be divided into two classes, namely, those in which the work is done from the mucous surface and those in which the attack is made from without the bowel.

Under the first class may be mentioned the method of dissecting off two or more elliptical areas of the mucosa and approximating the opposite poles of each denuded area by buried sutures introduced so as to produce transverse corrugations in the gut wall. The edges of the mucosa are then united separately by superficial sutures of fine chromic catgut, thus leaving exposed only a single set of sutures disposed circularly above and parallel with the internal sphincter. This operation

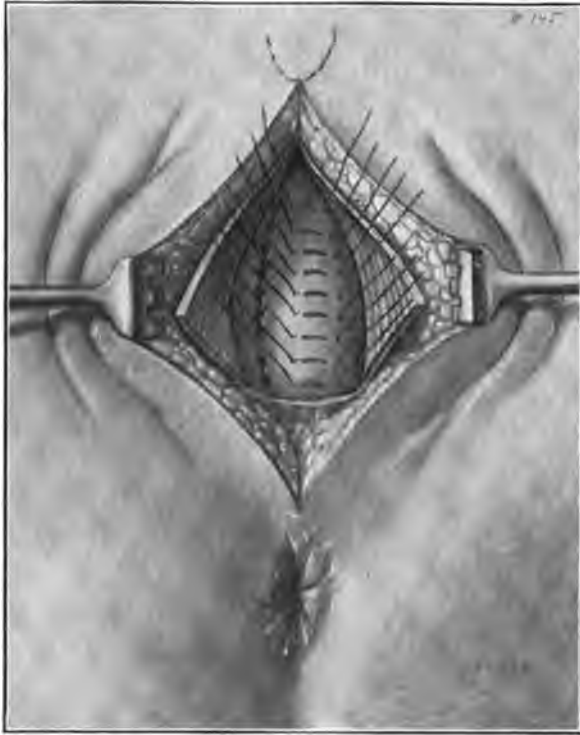


Fig. 134.—Lange's method, longitudinal plication.

would only be applicable to cases of procidentia of minor degree, and is open to the objection common to all plastic operations on the rectal mucosa, *i.e.*, the danger of infection.

Another method of shortening the bowel by internal rectorrhaphy consists of denuding the entire circumference of the prolapsed portion between parallel incisions through the mucosa and approximating the edges of the extensive cylindrical wound with catgut sutures. This is nothing more than a modification of the Whitehead operation and open to the same objections, though certain writers have recom-

mended it as giving excellent results even in aggravated cases (Fig. 135).

Among the operations illustrating the shortening of the bowel by external rectorrhaphy only those of Verneuil and Gant will be alluded to. Verneuil's operation is in reality a combination of the shortening and fixation methods of treatment. A triangular flap with its base two inches wide placed horizontally over the center of the coccyx and its apex attached just above the posterior commissure, is turned down over the anus, and the lower portion of the rectum

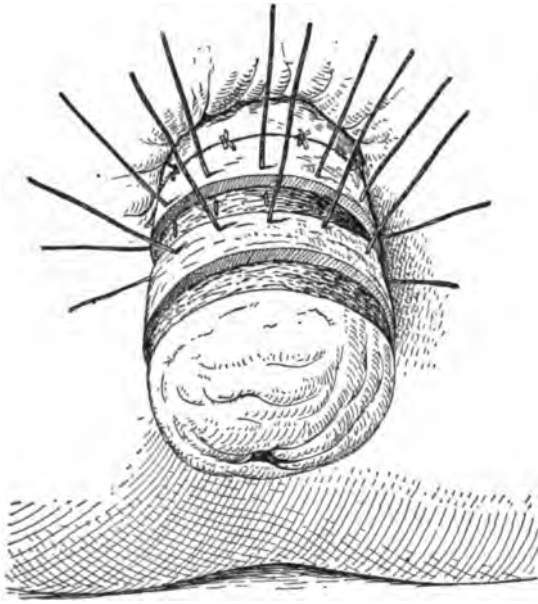


Fig. 135.—Internal rectorrhaphy.

dissected free, as in the Lange operation. Several sutures of chromic gut are then inserted deeply through the muscular coat in a longitudinal direction so that when tied the bowel will be drawn into transverse folds or plications and thus shortened. One or more of the sutures on each side are left long and brought out by means of an eye-point needle or ligature carrier on the corresponding sides of the coccyx across which they are tightly tied. In this way the posterior wall of the shortened rectum is drawn up and securely fixed to the bony pelvis. The flap is then replaced and sutured in its original position.

Gant's operation is performed by making a transverse incision two inches in length midway between the coccyx and anus and

dissecting the posterior wall of the rectum free of its attachments. By means of two fingers introduced through the anus the posterior wall of the rectum is pushed out through the wound and drawn down as far as possible. A longitudinal incision two or more inches in length is then made entirely through the rectal wall and the incision closed by suturing it end to end so that the resulting wound will occupy a transverse position, thus shortening the bowel. The operation is completed by inserting a row of Lembert sutures so as to reinforce the first set and further shorten the gut, after which the original incision is closed. This procedure can only be commended for its ingenuity. Aside from the obvious and insuperable danger of infection, it accomplishes no more than is accomplished by the suturing without incision of the gut, and in addition is much more tedious and complicated.

3. Fixation (Suspension) of the Mobile Gut—Rectopexy; Sigmoidopexy.—This is the method of treatment which most rationally meets the indications in the great majority of cases of complete prolapsus. Simple cases of the first degree type may often be handled with perfect satisfaction by certain of the operative procedures already discussed; but in practically every case of the second and third degrees the logical method of procedure is to return the aberrant viscus to its normal position and secure it there. Manifestly, in exceptional cases this cannot be safely done on account of the pathologic changes which have occurred in the prolapsed gut. In such event the more radical measure of excision of the offending structures must perforce be resorted to.

A number of different methods of fixation have been devised. Depending upon whether the rectum or sigmoid is attacked, these are termed respectively *rectopexy* (proctopexy) and *sigmoidopexy* (colopexy).

Rectopexy.—The concluding steps of Verneuil's operation, described on page 312, illustrate the principle of rectopexy. In that operation the coccyx is utilized as the base of support and only the lowest portion of the rectal ampulla is dealt with. By far the best method of performing rectopexy is that of Fowler as modified by Tuttle. It is described by Dr. Tuttle as follows: The patient is placed in the left semiprone position with the hips elevated and the thighs well flexed, and the prolapse is dragged down to its full extent and held by an assistant. "A curved incision about two inches in length is made with its convexity upward midway between the coccyx and anus. This is carried through all the tissues into the retrorectal space. With the fingers or a dull instrument introduced through this

incision, the rectum is separated from the coccyx and sacrum posteriorly as high up as the attachment of the mesorectum, and on the sides as far as the attachment of the lateral ligaments. The latter should be sedulously preserved. The anterior surface of the bone is then gently curetted to remove the fatty tissue and freshen it. At this point the assistant reduces the prolapse, and with his fingers inside the gut inverts and brings it out through the incision; the operator catches the protrusion and drags the gut down as far as it will come, usually a little less than the amount prolapsed through the anus. The external surface or muscular wall of the gut thus exposed is then curetted as was the sacrum. Silkworm-gut or silver-wire

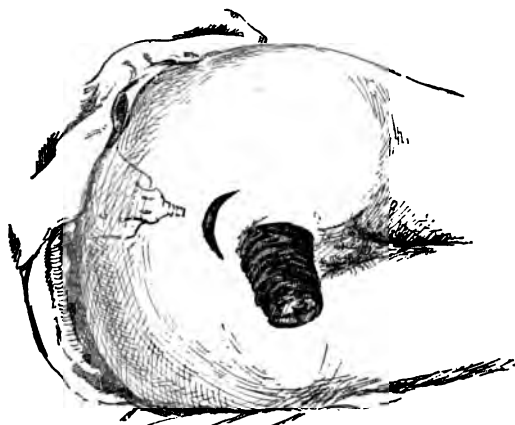


Fig. 136.—Fowler-Tuttle method of rectopexy.

sutures are then passed through the muscular layer, embracing as much of the circumference of the gut as possible; they are placed one-half inch apart and the ends left six to eight inches long. After the sutures are placed, the ends of the upper ones are each in turn threaded on a long curved Peasley's needle and carried up through the wound to the highest point of the separation between the rectum and sacrum, where they are made to penetrate the tissues, and are brought out through the skin on opposite sides of the bone. The other sutures are treated in like manner, each being brought out one-half inch lower than the preceding one. The ends are then drawn taut, and the prolapse is thus dragged up into the hollow of the sacrum, where it belongs. A pad of gauze is laid over the sacrum and the sutures tied over this to avoid their cutting into the skin. The gut is thus anchored in close apposition with the sacrum, to which it unites in due time." Dr. Tuttle reports splendid success with the operation, but very

properly calls attention to the fact that it is only applicable to cases in which the prolapse is limited to the portion of the rectum below the level of the area entirely invested by peritoneum. It could obviously not be considered in any case of prolapsus of the third degree (Figs. 136, 137, 138, and 139).

Sigmoidopexy.—This is the method especially adapted to the management of procidentia of the third degree. It would no doubt prove fully as effective in the majority of cases of the second degree, and probably even in many of those of the first degree also. But inasmuch as it necessitates an abdominal incision, it should not be

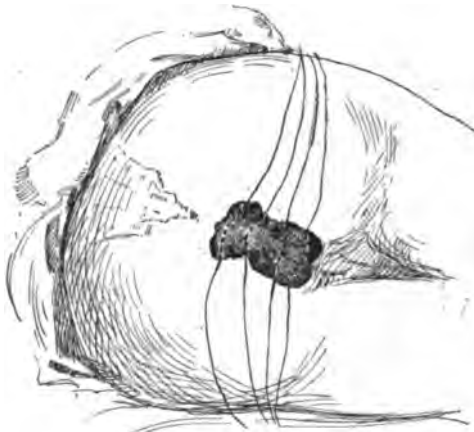


Fig. 137.—Fowler-Tuttle method of rectopexy.

lightly considered where less heroic and equally reliable methods are available.

The credit for first suggesting this method of treatment belongs to Mr. Herbert Allingham, who in 1888 stated his belief that abnormal elongation of the mesentery was a factor in the causation of procidentia, and mentioned fixation of the sigmoid to the abdominal parietes as a possible remedy. Verneuil, in the following year, was the first to make a practical application of the idea. Since then the operation has been performed by a great number of surgeons, and with the perfected technique of today in the hands of the experienced operator may be said to be as free from danger as it is effective in result.

Before describing the operative procedure let us be sure that we understand just what we may expect to accomplish by it. If the procidentia is rendered possible by reason of abnormal length of the

sigmoid mesocolon, either congenital or acquired, as is undoubtedly true in cases of the third degree variety (invagination), and perhaps also in a considerable percentage of those of the second degree, the clear indication is to attack the trouble at its point of origin. Shortening the mesentery itself would at first glance appear to be a reasonable method of procedure; but on consideration of its anatomic relations to the intestine it is evident that this could not be done in any effective way without serious risk either of interfering with the blood-supply or of producing obstruction. It only remains, then, to straighten out the redundant mesosigmoid and anchor the bowel in such position as to prevent its future descent.



Fig. 138.—Fowler-Tuttle method of rectopexy.

As first suggested and practised the operation consisted of lightly scarifying the convex surface of the gut for an inch or so opposite the mesenteric attachment and suturing it to the parietal peritoneum. This method often proved of only temporary benefit because of the fact that a *suspension* instead of a *fixation* of the gut was all that could be accomplished by this technique, and a thin peritoneal band of variable length was ultimately the only support secured. A similar error was responsible for failure and disappointment in many of the earlier attempts to correct prolapses and retrodisplacements of the uterus by attaching it to the anterior abdominal peritoneum. In order to insure satisfactory results in either case it is now recognized that the one absolute essential is to employ a technique which will secure permanent and unyielding union between the sutured surfaces.

Sigmoidopexy is quite a simple operation and may be very quickly performed. The following method will be found to meet every requirement:—

The preparation of the patient and the anesthetic are the same as for any other abdominal operation. An incision three inches in length is made over the outer portion of the left rectus muscle midway between the umbilicus and symphysis. The sigmoid colon is located and pulled up from below as far as possible. A row of number 1 ten-day chromic catgut sutures is introduced at intervals of one-third to one-half inch, first through the aponeurosis and a few fibers of the muscle on one side, then deeply beneath the longitudinal band of the intestine, and through corresponding structures on the opposite side (Fig. 140). Four to eight such sutures are placed and the ends left long and grasped by forceps on either side. The bowel being held well up in



Fig. 139.—Fowler-Tuttle method of rectopexy.

the wound, the edges of the peritoneal incision are now sutured to the serous coat just outside the longitudinal band on each side with number one plain catgut. The chromic sutures are then tied, thus retaining the gut in close apposition with the fascia and muscle (Fig. 141). It is a good idea to first anchor the mesentery firmly to the abdominal wall by a single suture of chromic catgut or silkworm gut. Firm union may be additionally assured by freshening the surface of the gut over the area embraced by the sutures. The remainder of the wound is closed in the usual way. The patient should remain in bed for at least two weeks, and should be moderate in diet and exercise for as much longer. Occasionally a sensation of traction or dragging at the site of the incision will be complained of for a short time, but ordinarily a perfectly normal condition is rapidly regained with complete relief of former suffering.

4. Resection (Amputation) of Prolapsus.—The indications for resorting to this method of treatment are few and well defined. As a

broad general working rule it may be said that resection is contra-indicated when the prolapsed bowel is capable of being reduced. It must be noted as an important exception to this rule, however, that in cases of prolonged strangulation where any doubt remains as to the viability of the part, even when reduction can be effected it may be extremely hazardous to return the bowel to its normal position on account of danger of subsequent sloughing and perforation. Other

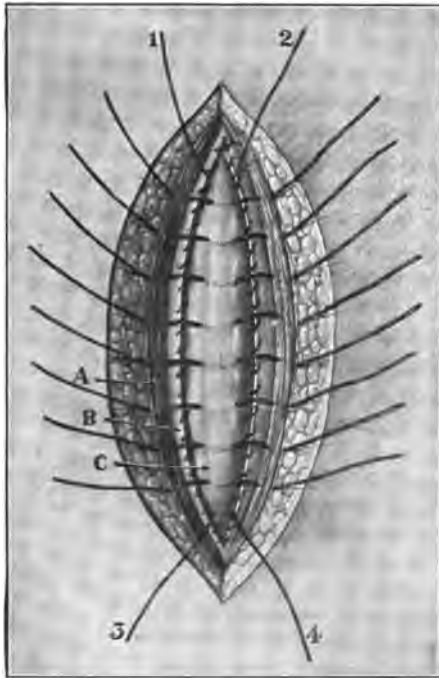


Fig. 140.—Sigmoidopexy sutures. 1-2, 3-4, guy sutures; *A*, rectus muscle; *B*, peritoneum; *C*, longitudinal band of gut.

indications may be briefly stated: old cases in which extensive ulceration and thickening with fistulous tracts of unknown depth and extent are present; organic stricture which would not be amenable to less radical methods of treatment; and malignant growth involving the prolapsed gut.

The possibility of invading the peritoneal cavity is usually given as the greatest danger of the operation. This possibility is of course present in all cases, and the occurrence may be confidently expected in cases of the second and third degree. While this danger is not one to be disregarded, the time has passed when it should be allowed to deter a competent surgeon from performing any operation which

the conditions present clearly indicate to be to the best interest of his patient.

The possibility of the existence of hernial contents in the protruded mass is a matter of much greater significance. This complication may obtain in any variety of complete prolapsus; and it requires no flight of fancy to conceive the disastrous consequences which would be invited by the wounding of a coil of small intestine in the operation of excision. For this reason no method of operating should be considered which does not include a careful open dissection of the part to be removed. In this way the peritoneal sac, when present, may be readily identified and any viscus it contains properly handled.

It is doubtful whether any case of procidentia of the third degree should be submitted to the excision operation. And the same applies to cases of the second degree in which the bulk of the prolapsed mass is so great as to indicate that a portion of the colon is implicated. In both these conditions it is very certain that sigmoidopexy is a far safer procedure, and if properly done the result should be equally as effective. It is perfectly feasible also in this class of cases, if for any reason resection of the redundant bowel seems imperative, to do the work through an abdominal incision. When the condition is attacked from below it is often necessary in order to gain access to the parts to remove the coccyx and part of the sacrum (Kraske's operation),—a method at once difficult, mutilating, and exceedingly dangerous.

Numerous methods of performing excision have been described. Those devised by Mikulicz, Klebrog, Treves and Fowler are best known. In principle all are essentially similar, the differences consisting of modifications in relatively unimportant details. Here only one method will be described, the purpose being merely to give the salient points in the operation.

Assuming that the case is one of complete procidentia of the first degree, the technique is as follows: The patient, having been properly prepared and anesthetized, is placed in the lithotomy position with the pelvis elevated so as to favor the escape of any hernial contents from its sac. The mass is now again thoroughly cleansed and a sterile sponge or gauze packing introduced into the bowel well above the field of operation. Several pairs of T-forceps are attached, by deep bites, to the apex of the protrusion around the aperture into the lumen and the bowel drawn out as far as possible, the forceps being left in place for traction. Beginning on the anterior surface where the peritoneum, if implicated,



Fig. 141.—
Sigmoidopexy
fixation suture
completed.

will first be encountered, a transverse incision two inches in length is made through the mucosa one-half inch from the anorectal line and cautiously extended through all the coats of the outer cylinder. When the peritoneum is opened the finger is introduced to make sure that there is no adherent coil of intestine or other viscus present. The incision is then extended through the serous coat of the inner cylinder and the contiguous edges of the serous coats of the two cylinders accurately approximated with a continuous catgut suture. The incision is carefully continued in a circular direction, following closely with the suture until the peritoneal cavity is entirely closed off. Chromic gut sutures are now passed through the adjacent cut edges of the mucous and muscular coats at short intervals to control hemorrhage and prevent retraction, and the circular incision through both cylinders extended until the amputation is complete. The work will be much facilitated by placing the chromic gut through and through sutures at intervals of about one-half inch, advancing the incision only by steps of similar length at a time. When the amputation is complete a more secure and accurate approximation should be made by means of a running suture carried entirely around the bowel. In order to facilitate this all the interrupted sutures should be left long to serve for steadying the part. Any slight protrusion now remaining may readily be reduced by gentle pressure. The bowels should be confined for four or five days and moved for the first few times by enemas. When primary union is secured recovery is rapid and the result most satisfactory. Unhappily, however, this is an exception, and granulation must be depended upon for the healing of at least a portion of most cases.

Occasionally a widely patulous anus may seem to demand attention. It is better not to complicate the case by operating for this at the same time. Nature may correct the condition, and in any event a second operation would in every way be preferable.

CHAPTER XVII.

Stricture (Fibrous, Non-malignant).

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STRICTURE of the rectum may be defined as a diminution of the lumen by the encroachment of plastic material in the wall of the gut. This fibrous deposit manifests itself organically, in the form of annular, tubular, linear and valvular stricture.

Annular Stricture.—This type shows itself by a symmetrical occlusion involving the entire circuit in a certain plane of the rectum or anal canal. The base of the constriction may reveal an exudate covering one to three inches of the gut wall, if located above the anorectal line, and gradually thinning out toward the center of the lumen, forming a curtain with an aperture frequently so small as not to permit the passage of a small finger.

Tubular Stricture.—If the exudate in the wall of the bowel extends beyond the limits above described and circumscribes one or all of the rectal chambers, the term "tubular stricture" is applied,—a much more serious condition than the annular type.

Valvular Stricture.—When one or more of Houston's valves become hypertrophied by virtue of hyperemia, plastic exudate or a fibrosis, the valve becomes obstructive to the fecal excursion analward, and this is called valvular stricture.

Linear Stricture.—This type is the most obscure and difficult to diagnosticate, and yet the cause of much discomfort to the victim. I prefer to designate this class of stricture as belonging for the most part to the anal canal, since my experience convinces me that scar tissue in a segment of the bowel usually results from a healed ulcer or from operative interference for hemorrhoids, fistula or fissure. By inference, therefore, a linear stricture is a thickening of one side of the wall in the anal canal.

The Rectal Shelf.—There is another form to be added to the above list, which, by the way, is the usual list described by authors, namely, the rectal shelf, which occurs above the plane of the levatores ani and is one of the signs of visceral malignancy, by virtue of extension in the pelvic cavity through the lymphatics.

Stenosis of the rectum also occurs from certain extrarectal pathology involving the uterus and its adnexa, the prostate, abscess, and tumors. Such varieties are to be distinguished from fibrous non-malignant stricture, which is the subject under consideration in this chapter.

ETIOLOGY.

Most authors include congenital defect in treating the causes of fibrous stricture. They describe partial and complete obstruction which occurs at the genital plane in the embryo as suspended development. The reader is referred to the chapter on "Malformation of the Rectum" for description of this variety.

True stricture is caused by the process of inflammation. A second variety is described by Cripps as due to atrophy of the fibrous structure in the levator ani muscles. Most authors give a place to spasmodic stricture, so called on account of contraction of the circular fibers of the bowel, but such enterospasm is usually associated with some lesion resident in some segment of the colon, rectum or anal canal. Hence the resulting temporary stenosis is indirectly due to inflammation, as stated in my first proposition. The inflammation begins in the mucosa and extends to the submucosa and muscular structure, infiltrating these tissues, leading to fibrous stricture. Cicatrization, which is a sequel to the inflammatory process, continues to diminish the caliber and offers greater resistance to the descent of feces, since its texture is hard and inelastic.

To clarify the reader's mind, the factors initiating the production of stricture may be enumerated as follows: *Traumatic, tubercular, dysenteric, gonorrheal, syphilitic* and *neoplastic*. These various causes are applied to the beginning process on the mucosa.

Stenosis Due to Traumatism.—It is well known among proctologists that great care must be exercised in operative procedure upon the anal or rectal walls, in order to avoid narrowing of the lumen consequent upon a cicatrix. This is especially true of the hemorrhoidal inch, which rebels against transverse and slanting incisions and open wounds, but the function of which is preserved when the incisions are axial and at right angles to the guarding muscle.

I have encountered a large number of cases of anal stricture following reckless and unskillful removal of piles by the Whitehead, cautery, and ligature operations. The vicious cicatrization is due to injury of the submucous layer, causing a cellulofibrous infiltrate, resulting in stenosis. Traumatism may also result in difficult labor from the prolonged pressure of the head in the parturient canal,

bringing about rectal prolapse, wounding the anterior anal commissure, or effecting a slough to be repaired by granulation. It is well to remember also the tendency of certain individuals to develop a fibrosis following traumatism of submucous structures.

Dysenteric Ulceration.—There is a difference of opinion in treatises upon the rectum as to the etiologic relationship of dysenteric ulceration and stricture. Mathews in his admirable book denies the possibility of such an issue, basing his argument on the fact that army statistics were lacking in evidence in any of the multitude of cases of chronic dysentery culminating in fibrous stricture. On the other hand, Edwards¹ reports an article of Dr. Joseph Ewart, professor of medicine in Calcutta, in which he states that “if the ulceration involve a large portion of, or the whole circumference of, the mucous membrane, the subsequent contraction may produce dangerous narrowing of the caliber of the gut or stricture of the sigmoid or rectum.”

I have observed the morbid condition to extend from the ano-rectal line to the appendix, but I have yet to see contraction in any portion of the colon as a result of amebic dysentery. We must remember that the essential process leading to stenosis must involve the submucous structures and that, if the solution of continuity is confined to the mucosa, no stricture will ensue.

Tubercular Ulceration.—It is disputed that tuberculosis leads to fibrous stricture of the rectum, since in the early stages of such ulcer it is confined to the mucosa and when it reaches a later stage of development the tissues involved have a tendency to disintegrate and slough. Moreover, the morbid condition tends to attack different areas of the gut simultaneously rather than to concentrate its force at a given site. Again, its invasion of the deeper structures seems seldom to occur, a *sine qua non* for the production of fibrous stricture, such invasion being prevented by the formation of pathogenic membranes walling off the ulcer. I believe this to be the usual behavior of tubercular ulceration of the bowel. However, I happen to have under observation, at this writing, a case of tuberculosis of the rectum with an annular fibrous stricture at the site of the second valve of Houston. The comparative rarity of such a case in my experience prompts me to record it in this chapter. I have seen a number of rectums with tubercular ulceration, but this is my first accompanied by a stricture:—

M. J. F., male, age 55, was referred by Dr. K. to my service in the Presbyterian Hospital. His general appearance betokened some

¹ Edwards: Diseases of Rectum, etc., p. 245.

chronic dyscrasia; he was reduced in flesh, nervous and rather anemic, and easily fatigued. No evidence of disease in heart, lungs, or other vital organs. Said he had been ailing for ten years on account of frequent rectal discharges, at the same time he was compelled to resort to laxatives in order to secure a passage; that both the discharges and constipation had been growing steadily worse.

Physical examination with the finger deeply inserted revealed stenosis at the level mentioned, which was corroborated by proctoscopy, in addition to a number of ulcers down to the levator ani plane, which proved bacteriologically to be tubercular. The base of the deposit seemed to involve about three inches of the wall, the middle portion conically jutting into the lumen sufficiently to prevent the passage of the proctoscope through the aperture.

This case illustrates the possibility of inflammatory excursions into the submucosal structures, even if the primary lesion be tuberculosis.

Venereal Ulceration.—Most writers are probably in accord with the doctrine that venery is antecedent to a large percentage of fibrous non-malignant strictures of the rectum. Traumatism, tuberculous ulceration and venereal diseases constitute a trio of factors giving rise to inflammatory exudate; but we must record our conviction that gonorrheal infection and syphilitic ulceration must be reckoned with in a great majority of cases. I have observed 100 cases of fibrous stricture in the rectum and 75 per cent. of that number was traced to syphilis, including 5 due to chancroidal ulceration.

I have little doubt that the process of deposit begins in the bowel, as in cases following traumatism and tubercle; and yet the theory is advanced that the pathogenesis may not have its origin in the mucosal ulcer.

Fournier states that the anorectal syphiloma does not ulcerate, but that it produces a gummatous hyperplasia terminating in a fibrous degeneration with a persistent contraction of the submucosal structures. The deposit is found in the muscular and connective tissues in nodular masses involving the arteries with endarteritis.

I have not observed a stricture of syphilitic origin that was not preceded by a mucosal ulcer. Tuttle² states: "In a somewhat extensive experience in rectal and genitourinary diseases, no stricture of this type (fibrous) has been seen in which the probability of previous ulceration of the rectal wall could be eliminated." It is quite possible that the proctoscope has clarified the situation somewhat since the days of the

² Diseases Anus, Rectum and Pelvic Colon, p. 471.

Fournier proclamation, in that rectoscopy is practised in the pretertiary stages and gives us definite knowledge of the rectal cavity that was formerly a *terra incognita*, thus accounting for the apparent difference of opinion among proctologists.

It is obvious that the extent of the plastic exudate is not commensurate with the size of the initial ulcer, since the area of fibrous degeneration may extend several inches beyond its limits; and this inflammatory condition, aggravated by the fecal excursions over the ulcer, is a prolific source of stricture.

Neoplastic Stricture.—Tumors may form within the cavity or be intramural and obstruct the passage; but since these are considered new growths, the reader is referred to the chapters on "Neoplasms." Constipation, injection of irritating solutions, pederasty and introduction of foreign bodies may be mentioned as causal factors in ulceration and subsequent fibrous stricture, in rare cases.

PATHOLOGIC ANATOMY.

In discussing the pathologic anatomy of stricture, it is necessary to fix the location and stage of the stricture development. There should be definiteness in location: for example, instead of saying the stricture is so many inches up, we should be able to name an anatomic landmark,—as anal canal, levator ani plane, first valve, first rectal chamber, etc. It is well, therefore, to think of the terminal portion of the alimentary tract as (1) the anal canal, one and a half inches long and limited above by the anorectal line, and (2) the rectum extending from this point to the rectosigmoid strait opposite the sacral promontory, measuring about four or five inches. The location of a stricture may be in any part of these divisions. This does not mean that other portions of the colon are immune to ulcers and strictures, but the solution of continuity is much more frequent in the terminal areas. Most strictures, especially the annular type, are found in the levator ani plane, which most authors describe as two or three inches up. Edwards³ gives Perret's statistics as most reliable, in his report of 58 cases. In 4 of these, the stricture began at the anus; in 32 the strictured portion was less than six centimeters distant; in 3, at six centimeters; in 7, between six and nine; in 5, above nine; and a similar number at the junction of the rectum with the colon. Tubular stricture, which may involve the entire length of the rectum and anal canal or portions of them, is the most severe type, and reduces the caliber by cicatricial contractions of the wall so that palpation through the vagina gives a cord-like feel to the finger.

³ *Loc. cit.*, p. 246.

The chronologic formation of the stricture begins with the mucosal ulcer of whatever type; its margins thicken and the induration extends to the deeper structures by continuity and through gland elements involving the entire circumference of the bowel; and if the inflammatory process is intense, the occlusion may rapidly be reduced to the size of a lead pencil or may become complete. This is especially true of such lesions in the anal canal. The formation in the rectal planes is apparently much less rapid. Secondary changes occur, such as spreading of the ulcer with complete destruction of the mucous membrane, from which center there radiates, for a variable distance above and below, an area of hypertrophic catarrh, enlargement of solitary glands, and above the stenosis there is marked dilation of the gut.

Esmarch states that the enlarged glands may form the beginning of cylindrical epithelioma. Proctoscopy reveals a grayish color of the diseased area and a tough, leathery, unyielding sensation to touch. There is also to be observed a mucopurulent product, frequently blood-stained, coming from the ulcerated area. The offending obstruction retains the material above it so zealously that nature revolts, to the end that abscesses may form behind the stricture in order to form an exit, since the discharges are not permitted to escape through the stenosis. These fistulæ may be single or multiple, connect with the skin surface, bladder, urethra, vagina, Douglas's *cul-de-sac*, Richet's space, or with the peritoneal cavity itself. The determining factor in the direction the fistula takes is the plane of the ulcer or stricture, together with the duplications of the pelvic fascia.

There is not only dilation of the wall above the sclerous formation, but it becomes thinner, hence great care is to be exercised in the introduction of bougies or other instruments for diagnostic or therapeutic purposes.

Strictures are of large caliber and small caliber, depending upon the extent of inflammatory contraction of submucosal structures. Tuttle⁴ states that "the fibrous portion of the stricture is not always the narrowest; that there is a tendency in syphilitic ulceration to heal in the lower portions while it extends upward." The cicatrix is tough, inelastic, and feels like a ligamentous band.

SYMPTOMS.

The symptoms of fibrous stenosis of the anal canal or rectum are rather obscure and confusing in the early stages. They may be divided into two periods,—the ulcerative stage, and the period of obstruction.

⁴ *Loc. cit.*, p. 473.

The so-called latent period is in reality synchronous with the inflammatory development; hence there is no need for such additional division. The prodromes are so misleading frequently that little or no attention is paid by the victim until the gross symptoms of obstruction lead him to seek advice. It is amazing that the general comfort and health may be maintained in the presence of stricture even of small caliber or near complete occlusion.

The Ulcerative Stage.—The symptoms of the ulcerative or formative stage include certain local and reflex phenomena which should lead one to suspect inflammatory changes in the terminal canal. These signs may be termed rational or subjective, and physical or objective. The rational symptoms consist of heaviness and dragging sensations in the loins and perineum, aching down one or both legs, especially if the lesion be in the anal canal, vague pelvic pains, which in women may be referred to the uterus or adnexa, and apparent cystitis and prostatitis owing to the proximity of the contiguous inflammation. As the process advances, these rational signs become aggravated and the reflexes multiply, affecting stomach, appendix, and other remote parts, developing a condition of neurasthenia as obstipation increases.

The physical signs in the ulcerative stages are: perineal moisture, perhaps pruritus, skin redundancy, excoriations, frequent mucorrhœal discharges, which may be tinged with blood and purulent material, especially if the ulcer be tubercular. One effect of rectal stricture is to induce obstipation and extreme dilatation of the colon. Moreover, immediately above the constriction are found the active ulcerations, the source of profuse discharges of pus, blood and mucus. Among other symptoms may occur colicky pains in and distention of the abdomen, backache and loss of flesh. Ulcerative discharges vary with the type and location of the ulcer. The dysenteric and tubercular types are more profuse, while the traumatic and syphilitic ulcers give off little secretion, and therefore the period of deposition is insidious, with few characteristic ulcer symptoms.

Period of Obstruction.—Symptoms referable to obstruction begin by simulating constipation. Mild aperients are taken to overcome the apparent sluggishness of the bowels; but instead of their improving, stronger cathartics are resorted to, and even injections, with the hope of relief. The excrement is for the most part of liquid consistency, especially if the stricture be in the anal canal. Ribbon-shaped feces will occur if solid matter is forced through the contracted strait. Here, too, the appearance of the feces varies according to the site of constriction; if in one of the valvular planes, the solid material may escape through the stenosis and reform below the stricture, deceiving the observer by its

normal appearance. This is apt to be the case, obviously if the stricture is located in the sigmoid or colon, and great care must be exercised in order to recognize the condition.

Another important physical sign of obstruction in the rectal ampulla is the patulous anus accompanied usually by moist skin on account of leakage through the anal strait. This feature is more marked as the stricture increases the obstruction. Then large accumulations of feces and gas will occur above the stricture, the abdomen will become enormously distended and eructations frequent, the stomach will become irritable, there may be nausea; the patient grows anxious, perspires freely, becomes anemic, as the result of autointoxication; and the patient will frequently spend a half day trying to effect a passage, the relief thus obtained carrying him over to the next day, to be again repeated; all of which combine to develop profound hypochondriasis and general ill-health. In these later stages, periods of diarrhea will alternate with constipation; and it not infrequently happens that abscesses form, burrowing their way in the direction of least resistance, thus aggravating local conditions, to say nothing of the subjective distress occasioned. Unless relief can be secured, the terminal symptoms in extensive ulceration and marked obstruction consists of an exaggeration of the symptoms already mentioned, together with exhaustion, peritonitis from perforation of the distended colon, the usual signs of complete obstruction, as stercoral vomiting, clammy skin, etc.,—ending in coma and death.

Symptoms incident to linear stricture in the anal canal are tenesmus, and, as in all strictures, a feeling after stool that the evacuation is incomplete, with a dull, aching sensation on one side of the anus, the site of the lesion. It must be remembered that the source of such encroachment upon the lumen is the result of a healed ulcer involving but one arc of the circle, the cicatrix shortening the circular fibers. This may occur in any level of the rectum, but is most frequently observed in the anal canal. There is an apparent relationship with the so-called spasmodic stricture, since, under anesthesia, there is little or no contraction. I believe the history of an antecedent ulcer will explain many cases of enterospasm. The anal cicatrix may be of traumatic origin following an operation for hemorrhoids, in which event the character of the excrement is molded, being flattened, grooved or reduced to a column the size of a lead-pencil.

The character and quantity of discharges depend upon the character of the stricture. The tubercular ulcer will produce a seropurulent substance for the most part, and yet there will appear at times blood-stained dejecta. The syphilitic stricture and the ulcerated surface above it are capable of evolving a large quantity of saniopurulent material with a

decided feculent odor. Again, the simple traumatic stricture gives off but little, if any, serous discharge and the chief symptom is a dyschezia due to the obstruction.

Certain constitutional symptoms are associated with the history of stricture and in proportion to the degree of ulceration, suppuration and constriction. Symptomatic complications likely to be associated are neuralgic pains, febrile expressions and various irritations in adjacent organs. It may happen that, owing to the extreme dilatation above the fibrous strait, perforation occurs which may prove fatal; but the life of the patient may be saved by timely laparotomy, or the infected area in the peritoneal cavity may become walled off, resulting in an abscess and fistula. I recently had just such a case, the pelvic cavity being filled with pus which I succeeded in draining through the rectum, placing a through and through drainage suprapubically.

DIAGNOSIS.

The trained finger is the most approved agent to determine the existence of stricture if located between the anus and the rectosigmoid strait. In thin subjects the finger can readily explore five or six inches and even the lower loop of the sigmoid by making counter pressure on the abdomen and instructing the patient to strain. In females the upper limits of the infiltration can be determined per vaginam, if it cannot be reached per rectum by reason of the extreme atresia. Under no circumstances should the constriction be forced through, since no advantage would obtain thereby, besides much pain and damage might result from such a procedure. The diseased wall, from whatever cause, is fragile, and perforation and hemorrhage might ensue in such examination, if the stricture is above the levator ani; however, if located below this point, such dangers will not obtain. Certain local manifestations would indicate a localized obstruction of long standing, as a patulous anus, redundancy of skin, moisture, one or more fistulous openings, and a bluish discoloration of the perianal area. To the finger, traumatic stricture is abrupt and resisting, arousing severe pain in an attempt to force the finger through the strait. The finger may disclose considerable induration of the wall before reaching the aperture; or the infiltration may be felt on one side only. The cicatricial opening may not be in the center of the normal caliber but to one side, and the finger may engage in a fold of mucous membrane.

As stated, little difficulty is encountered in locating stricture in the lower segments, but not a little skill is required for exact diagnosis of those located in the higher planes. I would discredit the use of such

diagnostic appliances as sounds, bougies and the like, to determine the site and degree of occlusion. Such instruments are dangerous, untrustworthy, and fail to reveal definite knowledge of the condition. It is so easy for a probe to engage in a mucous fold or diverticulum about the stricture as to render its use inadvisable as a diagnostic agent. A much more scientific procedure is the use of the modern proctoscope (Fig. 142), through which the eye can see the exact nature of the disease as regards texture, ulceration, color, resiliency and degree of obstruction.

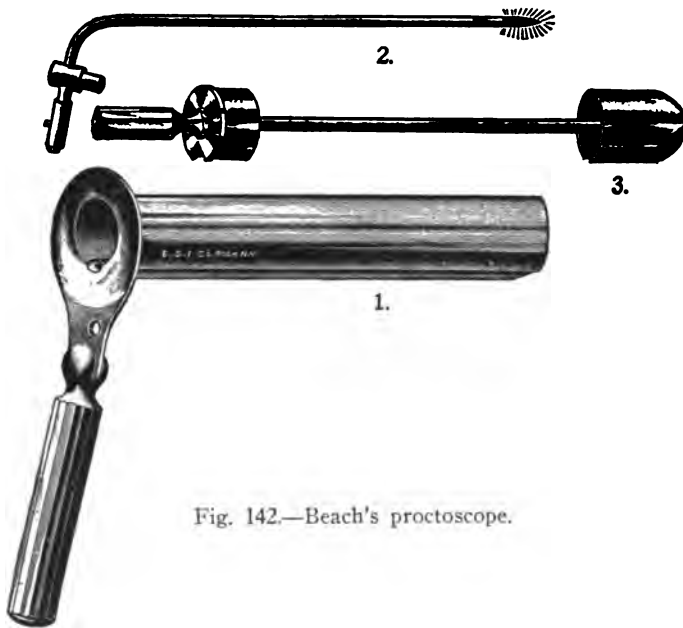


Fig. 142.—Beach's proctoscope.

This new instrument differs from the ordinary rectal tube in that it contains an illuminating attachment.

The apparatus complete consists of the metallic tube, a metallic light carrier, and a metallic obturator.

1. The tube (1, Fig. 142) varies in length from $1\frac{1}{2}$ (the anoscope) to 8 inches. Though any length can be made, the set usually contains three sizes: 1, the anoscope, $1\frac{1}{2}$ inches long; 2, the proctoscope, 4 inches long, and 3, the sigmoidoscope, 8 inches long. For diagnostic purposes, the caliber is $\frac{7}{8}$ inch; for operative purposes, as valvotomy, or removal of high-up polypus, the caliber is $1\frac{1}{5}$ inches, the same as in Martin's set. The handle is round and corrugated, and placed at the usual angle with the axis of the tube. In the wall of the tube on the side of the handle is

an auxiliary tube projecting both within and without the speculum to receive the light carrier (2, Fig. 142) ; it is so constructed that the diameter of the speculum is not appreciably enlarged or the caliber lessened. The auxiliary tube is lined with cement holding in place a specially prepared glass, which serves as a window at the distal end of the speculum. This glass can be subjected to high temperature without damage, so that the instrument can be sterilized with impunity. The glass window protects the incandescent light from any mucus, blood, or other material that may be present in the ballooned rectum.

2. The light carrier (2, Fig. 142) consists of a very light tube with a four candle power incandescent lamp on the distal extremity, properly wired, and made to conform with the shape of the speculum, when placed in the auxiliary tube. The proximal extremity receives the wires from a dry cell battery, the source of light. The handle is covered by rubber tubing to protect the wires, and is clamped to the upper border of the handle of the speculum.

3. The obturator (3, Fig. 142) consists of a metallic rod with enlarged distal and proximal portions to fit the speculum. The handle is an inch and a half long, which is held by the thumb during introduction of the instrument into the rectum. The two enlarged portions are fluted to pass over the auxiliary tube containing the light carrier.

On being called to the country to examine rectums, I have been hindered by reason of inadequate light, and in this instrument I have secured a direct light and one more satisfactory than the reflected light heretofore used in my office and in hospital work.

The Electro-Surgical Instrument Co., of Rochester, New York, have been patient and careful in constructing the outfit to my satisfaction. The complete outfit, including battery, is put up in a neat 8 x 10-inch case, ready to carry as a satchel.

The advantages of this proctoscope are: 1. It is simple in construction. 2. There is no reflector to obstruct the view of the operator. 3. The light is direct and perfect. 4. The patient need not come to the office or hospital for examination. 5. It is practical and useful to the general practitioner. 6. It can be sterilized. 7. With ordinary care, it will be serviceable for years. 8. With the patient in the Martin posture, it can be introduced without pain.

Differential Diagnosis.—The question of differential diagnosis consists chiefly in eliminating syphilitic stricture from all other forms, including malignant disease. Great care is required to lead us to correct conclusions. The history of the case will help us materially in reaching a rational conclusion; supplemented with proctoscopy and, if needed, with microscopy, it goes a long way in establishing a correct diagnosis.

The typical specific stricture will receive the finger as in a cone whose apex is upward, giving an impression very similar to that of an incipient dilating os uteri, resisting and inelastic. The surface toward the base of the cone is uniform, but has a rather gritty feel owing to the destruction of its mucous membrane during the period of ulceration. From 20 to 50 years is the age span, and sex offers no immunity. Vaginal palpation will reveal the tubular stricture as feeling like a rope.

Tubercular stricture is more extensive in its invasion, involving in one case under my observation the entire colon, reducing that organ to a mere vestige; and yet the tubercular process may be limited to a small area involving one side only, the final test being the bacillary colonies and points of caseation.

Diarrheal discharges and a history of amebiasis will be sufficient evidence of the dysenteric origin of stricture. The record of traumatism, operative or otherwise, added to the location and abrupt nature of anorectal stricture should make clear the traumatic origin.

Probably the most important question to be determined is the differentiation of the specific fibrous non-malignant stricture from the neoplasms. This should not be difficult since noting in the latter the life span of from 35 to 75 years in which scirrhus usually develops, the deep excavating ulcer on one side of the bowel, the peculiar odor emanating which cannot be mistaken when once recognized, the typical sanio-purulent discharge, the hard nodular feel, the rapid growth of sarcoma and adenocarcinoma, and the cachexia in its later development, which form a picture quite in contrast to the symmetry of syphilitic lesions.

CHAPTER XVIII.

Stricture (Fibrous, Non-malignant), *Continued.*

By WILLIAM M. BEACH, A.M., M.D.

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TREATMENT.

THE revelations afforded us through efficient proctoscopy, as to the nature and course of stricture, encourage the physician to abort or prevent a condition that in some cases is most difficult to cure, while others present most enigmatic problems. The chief difficulty in the way of early treatment is in failing to recognize early symptoms of inflammatory processes. Temporizing only shortens the period in which certain effective methods may be introduced to cut short a chronic disability. We may consider treatment of non-malignant fibrous stricture under three heads: (a) abortive, (b) palliative, (c) operative.

Abortive Treatment.—The postoperative care of anal wounds presupposes daily attention for ten days and once a week for a month in cases of fissure, ulcers, hemorrhoids and other diseases requiring anal incisions. The finger should be introduced at least weekly, to note patency as well as any vicious healing that may occur. Traumatic sources of stricture by this method can be met easily and very satisfactorily. The analogous condition in the urethra is treated on the principle of irritation, especially before the arterioles are destroyed, so that determination of blood to the part will cause absorption of an incipient stricture or infiltration. This same principle applies to the rectal mucosa and submucosa, as well as in simple traumatic cases. The irritation is best produced by the finger first, then with a tubular anoscope, thereby massaging the area and inducing a restoration of the resiliency usual in the anal canal. In this stage it may be well to use oleaginous preparations for the sake of retarding a too rapid course of healing which is conducive to an obstructive cicatrix. Such articles as zinc ointment, ichthyol, vaselin, etc., render valuable service, applied daily with the finger.

The preventive treatment of syphilitic stricture seems to me no less valuable, since routine proctoscopy in every case of secondary or

tertiary lues will readily determine the question of a localized involvement. Proper management of a solution of continuity in the rectal mucosa combined with constitutional treatment, I believe, would often abort or prevent the serious culmination that we so often encounter.

I have yet to see any benefit from the use of the iodides or arsenic in melting the luetic fibrous stricture, but, used in the initial stages, salvarsan and other standard alteratives will doubtless be effective. Nor is it well to rely upon the systemic remedies alone, as I have already intimated, but we should regard these agents and local applications as complemental.

The most serious difficulty attendant upon the early treatment of syphilis is a recreant patient whose mental contentment is at its height upon the disappearance of visible symptoms, local or general, and he consequently is unfaithful in his appointments with his physician. It requires much diplomacy to manage a case smoothly over a period of months or years; but in the consciousness of preventing serious sequelæ one should feel amply rewarded for his care and patience. It is possible for a gumma to be grafted on an antecedent anal ulcer, and when the process begins it spreads rapidly and destroys the vascular supply. The early local treatment should begin with the ulcer, by using pure phenol, or nitrate of silver carefully applied, avoiding surrounding healthy tissue.

The mixed treatment in ascending doses to the point of tolerance and an injection into the gluteal region of neosalvarsan will exercise a favorable influence on the local ulcer. It is advisable to inspect the rectum routinely in every primary case, or when venereal infection of any kind is suspected.

Palliative Measures.—It may be stated as a general proposition that fibrous stricture, of whatever origin, is preventable in the latent stages of its history; but when it passes into an active condition, more aggressive measures must be instituted to cure the simple traumatic species and inhibit the development of malignant processes. In 1896¹ I advocated the use of the electrocautery in tubercular ulcer of the rectum. I have since had no reason to change my mind as to its efficacy, especially when used in association with tuberculin. Recently in such cases, I have used the phylacogens with uniformly good results, and one never knows how often he may avoid future obstructive sclerous changes.

When the stricture is forming, note the origin first, and if the elasticity of the tissues is not marked it is even then possible to modify

¹ Mathew's Quarterly, January, 1896.

its course by palliative treatment and promote absorption to a degree; but when the sclerosis is pronounced, as in the luetic type, little can be done palliatively beyond a temporary dilatation for fecal egress. It is well to restrict the diet somewhat, allowing fruits and such articles to insure laxative stools and the minimum of colonic residue. Urge copious draughts of water; normal saline drinks are well borne, and develop a thirst that renders the fluid acceptable. Flush the bowel occasionally with a 10 per cent. solution of hydrogen peroxide, which will effectively clear out any scybala or dense fecal accumulations above the stricture. These are always a source of irritation to the suprastrictural ulcer and liable to result in impaction and complete obstruction.

Dilatation.—This procedure is the usual mechanical palliative measure. We may use gradual dilatation and forcible dilatation. In recent traumatic anorectal strictures the introduction of the finger is

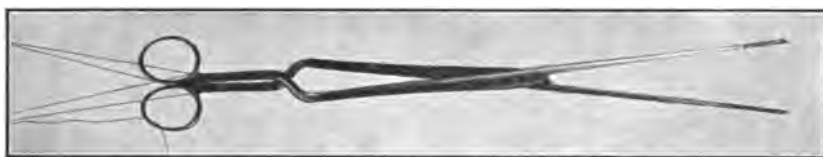


Fig. 143.—Beach's dilator.

frequently adequate, but various instruments are devised for both gradual and forcible dilatation, *i.e.*, the Wales bougie, Hegar's sound, Mathews's dilator, etc. As already stated, great care must be exercised in using these instruments, to avoid serious damage to the bowel which would aggravate the pathology besides introducing other complications.

In anal stricture multiple incisions may be made and followed with Kelly's conical dilator or a bivalve speculum dilator, to be repeated every third day till healing is complete. If the stricture is above the levator ani plane, gradual dilatation seems the best procedure, using graduated sounds such as are employed by gynecologists. The Wales bougie is an effective instrument and may be left *in situ* for a half hour and reintroduced daily. Anesthesia is not necessary with this technique. Evacuation will be much easier and the improvement continue as long as it is possible to apply these agents.

If the obstruction is below the reduplication of the peritoneum, forcible dilatation may be practised under anesthesia with no little success; but if the lesion is above this point, great care must be exercised in the use of force. Before such an attempt is made, proctos-

copy should be done to note the nature and extent of the fibrous growth. The writer uses Mathews's dilator for this purpose as well as a long-pronged spreader protected with cotton or rubber tubing (Fig. 143). This instrument has a dipped scissors handle. Wrapping the long blades with cotton and saturating it with olive oil, the blades are engaged in the stricture, through the proctoscope, and such force used as to overcome the fibrous resistance. This dilator seems to me to excel all others because the operator can see what he is doing, besides the oil will prevent rapid recurrence by the healing process, and, further, this can be done in the office and without anesthesia. The instrument is easily sterilized and simple in its mechanism.

I have used in these cases Hirschman's rubber dilator attached to an electromotor which not only supplied air but vibration. This method, while not so painful, is not so effective as the metallic instruments. Electrolysis seems to me to have its chief virtue in the name rather than in results to be achieved by its use. The fact is patent that none of these palliative measures offer more than temporary relief in syphilitic fibrous stricture; on the contrary, it seems to intensify the fibrosis by the repeated traumatisms resulting from the frequent use of dilators of whatever design. But in our endeavors to relieve the victim without operative measures, they constitute the only thing for us to do in high strictures and are really effective in traumatic anal strictures.

These patients should reside in the hospital for two weeks at least, especially if daily treatments are administered, and after each dilatation a warm solution of boric acid or permanganate of potash 1:500 should be injected, to be followed by an ounce or two of warm olive oil to be retained. The patient will feel much relieved after a series of dilatations in high strictures, but the recurrence is rapid and the patient's comfort can be augmented by the use of mild laxatives to overcome the constipation attendant upon these conditions. Castor oil is probably the laxative of choice, and if dyspeptic symptoms arise menthol $\frac{1}{2}$ grain with 5 or 10 grains of bicarbonate of soda will prove useful. The diet should be modified as already stated, to render the bowel contents as non-irritating as possible.

A final word as to the difficulty of treating the high strictures. Great care in using forcible dilatation should be exercised, since it is impossible to know the extent of tearing the indurated tissues which may follow. This may result in perforation and peritonitis, but the latter may even follow without perforation; and while I have recommended a certain degree of force to be used above the deflection of the peritoneum, the procedure is fraught with danger and should be

reserved for strictures below that point. The use of astringent and caustic agents is worse than useless, since they cause more scars and render the obstruction more resisting.

When it appears unwise or impossible to obtain relief in a palliative way, by reason of an increased cicatricial deposit and threatened obstruction with its accompanying train of symptoms, it is necessary to resort to operative measures. In so far as syphilitic fibrosis is concerned, even operative measures are at best only palliative, since relapse has been the uniform sequence in the writer's experience. In an article (1908, before the American Proctologic Society) on the "Treatment of Choice in Syphilitic Stricture of the Rectum," I argued that all temporizing to secure a patulous canal was really useless and generally aggravated the indurative process, even if excision were possible, and that the choice of procedure is to divert the fecal current by colostomy.

Operative Treatment.—The following operations will be discussed:—

1. Linear incisions with rapid dilatation.
2. Internal proctotomy.
3. External proctotomy.
4. Excision of rectum.
5. Colostomy.

Linear Incisions.—To perform this operation, the patient is placed in the lithotomy position, under general anesthesia. The stricture is located by the index finger, which is passed through the strait if possible, otherwise up to that point. Having determined the degree of obstruction, the left index finger is introduced as a guide over which a narrow bistoury with a straight blade is passed to a point above the stricture and the indurated base. Turning the cutting edge toward the coccyx, the blade is withdrawn, severing the cicatrix at that angle. Multiple incisions may be made in different arcs of the circle, even including an anterior incision. Usually from three to six strokes will suffice; then should follow rapid dilatation with Sims's dilator, bougies and finally a thorough exploration with the finger to ascertain the complete division of scar tissue. Finally an anoscope or Mathews's speculum should be used to note any spurting blood-vessels, which should be ligated. The dressing to be applied consists of a rubber tube of one-half inch caliber, wrapped with gauze, which is covered with gutta-percha or rubber dam. The length of this tube should be about four inches and its diameter, when wrapped, should vary according to the degree of continuous divulsion desired, usually an inch to an inch and a half. A stout silk thread should transfix the distal

end of this composite tube for the purpose of anchoring it *in situ* by tying it around folded gauze on the perineum. The distal end of the tube is made to disappear within the anal canal, and, to prevent oozing from the external wounds, strips of iodoform gauze should be tucked in about the lower end. This dressing will allow any discharges to emerge and will disclose any concealed hemorrhage. This mechanical device is not uncomfortable and is effective both as hemostatic agent and dilator, besides providing for irrigation. The tube should be removed in forty-eight hours, but irrigations and daily passage of soft bougies should be practised till healing ensues. I believe that in these, as in all cases of stricture, free use should be made of olive oil and other oleaginous preparations, with a view of softening the cicatrix and promoting absorption. The use of the iodides in proper dosage seems to me advantageous. The stools should be kept soft and in no case should defecation be prevented by the use of morphine. This technique is applicable to stricture in the anal canal of whatever origin, though they are usually the result of operations for the removal of hemorrhoids.

How long a bougie should be left in depends upon the character of the stricture, whether the region of constriction is yielding and flexible or is hard and resisting. Opinions differ somewhat on this question, but operators are generally agreed upon the above line of procedure. An inelastic and densely fibrotic stricture requires continuous pressure to overcome its mechanical resistance, and the bougie should remain from one to seven hours or even through the night, and long enough to overcome sphincteric contraction. On the other hand, when the tissues are softer, the introduction of bougies should be followed by withdrawal of the instrument immediately. The frequency of their application should be governed by the degree of resiliency of the area affected in its return to normal, as shown by the ease of defecation.

Internal Proctotomy.—This term is but a variation in nomenclature of the preceding detailed description. The operation, however, is applicable not only to low stricture areas, but the tubular form as well, especially its lower segments.

The Author's Technique.—The patient is anesthetized and placed in the lithotomy position. An incision is made from the anus to a point opposite the coccyx. As in the preliminary step for excision, the knife is passed just behind the rectal wall and up to a point about opposite the coccyx on the visceral side, dividing the tissues to the skin incision; the posterior wall of the rectum, including the stricture, is now divided and retractors applied, when bleeding points are con-

trolled with hemostats and the vessels twisted or tied. This initial step gives the index finger access to levels it could not reach hitherto, and the topography of the entire rectum can be explored. If other acquired contractions are felt, these are incised by a continuous posterior longitudinal sweep of the knife through the cicatrix joining the incision below. The proctoscope is now introduced, using reflected light, to note the general conditions and as a means by which gauze, saturated with adrenalin chloride or a solution of the persulphate of iron, is placed in order to secure hemostasis. These gauze strips are so placed that their ends hang out through the primary incision. These dressings, which are snugly packed, are allowed to remain in place thirty-six to forty-eight hours. If hemorrhage occurs after their removal, the cavity should be repacked, but this contingency rarely occurs. After the stage of hemorrhage is passed, we begin the introduction of Wales's bougies, graded sizes, through which $\frac{1}{2}$ of 1 per cent. solution of lysol is injected in pint to quart quantities, for the double purpose of antiseptis and evacuation.

The disadvantage of internal proctotomy is in dividing both sphincters, especially the internal. The line of incision in the external sphincter passes through the point of decussation of its muscular fibers, and while the trauma affects its power temporarily it quite recovers control over normal movements. Moreover, as stated previously, the patulous anus is frequently in evidence by virtue of fibrous formations in the rectal cavity, so that traumatic deficiency is no worse than the antecedent state. It is to be deplored that permanency of relief by this operation cannot be promised. Whatever results accrue are obtained by constant vigilance as to diet and laxatives and the frequent use of bougies.

External Proctotomy.—This operation differs from the preceding chiefly in its approach to the rectal cavity,—the preliminary incision being identical to that in the Kraske operation for excision. The patient is placed in the left semiprone position and an incision is made along the right margin of the sacrum. The coccyx should be removed, and even a portion of the sacrum if more room is required. The stricture is then divided by a posterior longitudinal incision. Other incisions may be made if the infiltration appears hard and unyielding. Bleeding points should now be caught and the cavity packed as in internal proctotomy, allowing the gauze tapes to protrude at the anus. The rectal wall is now sutured and provision made for drainage from the sacral wound. The passage of bougies is the supplementary treatment. The chief disadvantage of this operation is the danger of a fistulous tract at the point of incision; however, many will take this

chance as against fecal incontinence, since the sphincter muscles escape traumatism in external proctotomy.

Excision.—It is rarely necessary to resort to excision in non-malignant fibrous stricture when we consider the tendency to recurrence, this operation having little or no advantage over proctotomy in promoting functional activity of the rectum. Applicable only in the annular variety of the lower segments, excision should never be attempted in the tubular variety. Favorable reports are recorded of complete cure of annular luetic strictures by excision, but such patients turn up in a year or two to plague the enthusiast. I am therefore conservative in this matter to the point of discarding this procedure in the operative treatment of luetic stricture. Other types in the lower planes do better with the less pretentious technique of incision and proctotomy.

The technique of excision is described in the chapter on malignant disease, but a brief description is not out of place here. Of the three classical methods of approach—(1) perineal, (2) the sacral, and (3) the abdominoperineal—I shall note only the perineal method, since, for reasons that are obvious, the other methods are delimited. On the other hand, perineal excision is limited only to strictures in the lower planes. The patient, prepared and anesthetized, is placed in the lithotomy position, with hips elevated. An incision is made through the skin and fascia from the posterior anal commissure to a point opposite the coccyx, and the tissues freely divided to the bowel. With straight scissors the posterior wall of the rectum is now divided to the level of the coccyx, and spurting vessels clamped, not stopping to ligate, for speed here is an important consideration. Now a circular incision severing all the coats of the lateral and anterior portions of the bowel is made and, quicker than we are able to describe the process, the bowel is stripped to a point above the stricture, drawn down and severed. The circular incision being above Hilton's line, the sphincter muscles escape injury, except in the primary incision. After hemorrhage is controlled, the proximal portion is anchored to the mucocutaneous portion by interrupted linen sutures one-eighth of an inch apart, left long enough to hang outside the anus, and reinforced by a continuous catgut suture. The sphincter muscles are approximated posteriorly and provision made for drainage through the coccygeal incision. A soft-rubber tube should now be placed to permit the escape of flatus and other discharges. In ten days or two weeks, the linen sutures will have come away or by slight traction can easily be removed. Usually considerable shock follows this operation, the result of lowered blood-pressure and disturbance of the sacral plexus. This argument favors less radical operative measures in these cases, as does recurrence succeeding to the most thorough removal by resection.

Colostomy.—For extensive obliteration of the rectal channel by fibrous infiltrations, or stricture in the pelvic or iliac colon, colostomy, in my opinion, is the treatment of choice. Moreover, I give it precedence in many of my cases of annular stricture of syphilitic origin. It is obvious, from the principles involved in the pathology of syphilis, that any treatment that is palliative, for the purpose of rendering the canal patulous, only increases the irritation, conducing to a greater degree of stricture. For this reason, the injection of fluids is needed only for cleansing purposes. Such procedures as gradual dilatation with bougies, forcible divulsion, proctotomy, and even excision are only temporary.

Colostomy admits of direct irrigation of the rectal cavity, not so much with the idea of eradicating the disease as to produce healthy granulations of the ulcerated areas, and thereby lessen mucopurulent discharges. The administration of the iodides in ascending doses for interrupted periods is of high value, but I have never been able to melt a gumma by their employment.

Bland irrigations should be used daily for the first month, gradually lessening the treatments, and thereafter using normal saline solutions, alternating with solution 1:1000 permanganate of potash or nitrate of silver, 20 grains to the quart of distilled water or ichthyol a dram to the quart. Boracic acid solution is also very useful.

Permanent colostomy is much less objectionable to the patient than a rectum that offers continuous obstruction from the sigmoid down or even with an annular stricture. A half day may be consumed in effecting an evacuation which is both incomplete and painful. Defecation through a properly constructed inguinal anus is complete, painless and under good control, with normal stools. The patient is soon reconciled to his new condition and rapidly improves in general health.

In the operation of inguinal colostomy, care should be taken to secure a loop of the sigmoid well above the diseased area, else it is possible that the infiltration may appear at the wound:—

Mrs. J., aged 37, housekeeper, was admitted to the Presbyterian Hospital, in May, 1907. She denied luetic history at first, but later admitted infection at the age of 26; began to complain of constipation in 1904, growing gradually worse, when she consulted her physician, who, supposing it an ordinary condition, administered cathartics. In 1906, the second year of her obstipation, she consulted a general surgeon, who performed forcible divulsion, with only temporary relief. During this time she became much reduced in weight and a nervous wreck. After leaving this hospital, having resided there for several months, an abscess occurred which was drained by Dr. W., who later referred the case to me. Examination revealed multiple fistulæ discharging pus, the rectal

walls thickened, a tubular stricture extending from the levator ani plane to the sigmoid, and almost complete obstruction. The abdomen was distended and the patient suffered from colicky pains. The previous surgical effort made her worse, she stated. She was so miserable that little persuasion was necessary to gain her consent to permit me to construct a permanent inguinal anus, which I did in May, 1907. Since then she seems to have been in perfect health.

Direct surgical attack upon rectal syphilomas does not insure permanent relief, but rather aggravates the condition,—a strong argument in favor of inguinal colostomy.

As the operative technique will be described in another chapter, I refrain from appropriating space for this purpose, but would state that I recommend the Tuttle method as described in his book,² which instructs us to drag the loop of colon through the split fibers of the internal oblique and then through the subcutaneous channel, to emerge about three inches below and outside of the original incision.

Dr. Bacon, of Chicago, makes a clever suggestion to form an anastomosis of a loop of colon above the stricture to a point below the obstruction in the rectum and later to effect an opening there by means of pressure necrosis of the septum formed by the anastomosis. The objection of this method lies in the rarity or limitation of its application. I have in no instance found a case suitable for such a procedure.

The final word has probably not been said upon the treatment of rectal stricture. We must admit our disappointment in the ultimate outcome of all measures advised thus far and, contenting ourselves with curing simple traumatic cases, press vigorously the various procedures which are in the last analysis palliative only.

Stricture in the sigmoid may be variously treated by the surgeon:—

1. By using the inflated rubber bag passed through the proctoscope;
2. By performing a laparotomy, and if the stricture be limited a longitudinal incision may be made through the growth and sutured transversely, as in pyloroplasty; or
3. Colostomy may be performed. 4. Excision with end-to-end anastomosis or, 5, with a lateral enteroanastomosis around the tumor.

Spasmodic stricture may be managed successfully by leaving *in situ* a Wales bougie for periods varying from an hour to over night, in order to relax the circular fibers of the bowel.

Another condition simulating stricture occurs rarely, which may be called periproctitis, in which the mucosa is intact but the other coats of the rectal wall are inflamed and adherent. It is possible to promote

² *Loc. cit.*, p. 890.

absorption here by maintaining steady pressure at stated intervals, as in spasmodic stricture; but if this is unavailing, a more radical procedure may be necessary.

In extensive burns about the anus or dense scars in this region, it is possible by a sort of dermoplasty to restore the normal contour of the parts. In a case of tough and inelastic tissues of the perianal region following an extensive dissection for the cure of pruritus ani, I made an attempt to replace the scar area with sections of skin from the adjacent buttocks swung about on a pedicle, and with apparently splendid results.

RESULTS AND POSTOPERATIVE TREATMENT.

As already stated, the end results are not uniformly satisfactory, especially in syphilitic stricture; but even here we are able to modify its course, by following up the operation with topical applications of such agents as mercuric ointment or, better still, of iodoform, 1 dram to the ounce of petrolatum, applied through the proctoscope or smeared on a Wales bougie to be retained. The tubercular rectum responds well to this remedy. Various solutions are applicable, as $\frac{1}{2}$ per cent. lysol, 5 per cent. argyrol, and 2 per cent. ichthyol in one- or two- ounce quantities, to be retained. Unless we assiduously nurse these cases in this manner, recurrence of obstruction will certainly follow, with a resumption of the attendant symptoms of mucorrhœa and other discharges necessitating the wearing of a napkin to protect the clothing.

In the early history of operation by excision this was thought to be the ideal procedure for solving the problem of permanent eradication of stricture, but the lapse of a few years tells a different story. I herewith record a sample of many observations of a series of cases:—

Quénu and Hartman³ give a detailed account of 35 cases, in which these were 4 deaths directly due to the operation,—a mortality of 11.43 per cent. Of the remaining cases, 1 succumbed to pneumonia in about six months, 1 was at the time of the report in a dying condition from tuberculosis, and 10 were lost to view. In the 19 cases which they were able to observe for some months to four years, the results were as follows: 1 had been compelled to submit to colostomy, the stricture having returned; 18 others were suffering from rectitis and suppuration sufficient to compel them to wear napkins.

This emphasizes the tendency to recurrence, and convinces me that, after all, the best and most rational course to pursue in fibrous non-malignant stricture of the rectum proper is to divert the fecal current by a permanent inguinal colostomy.

³ Tuttle, *loc. cit.*, p. 509.

CHAPTER XIX.

Benign Neoplasms.

By GRANVILLE S. HANES, M.D.

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UNDER this heading will be included the simple growths of the anal region, rectum, and large bowel. These tumors are observed with moderate frequency and present characteristics peculiar to similar growths found in other parts of the body. They are usually composed of tissues resembling those in which they originate; they are circumscribed and in most instances are encapsulated, therefore, their mobility in relation to circumjacent tissues. They do not infiltrate surrounding structures nor do they give rise to metastatic growths or lymphatic involvement. The vascular supply is usually small, hence they are of slow growth. They do not return after complete removal.

For the sake of convenience and simplicity, I shall first describe those tumors most frequently found in the vicinity of the anus, subsequently dealing with those originating in the rectum and large bowel.

BENIGN TUMORS OF THE ANUS.

Fibroma of the anal region is a very rare condition, and especially is this true in children. These tumors are often more or less pedunculated and are usually attached by broad, short pedicles. If the tumors originate in the anal canal the pedicles are usually of sufficient length to allow them to present at the external anal orifice. They are local formations and usually originate from connective tissue as a result of local irritation. When found about the anus they generally appear as hard, ovoid tumors with a broad base. They vary in size from a pea to a tumor weighing one pound or more. The average size is about that of an olive.

These growths consist of parallel and wavy bundles of connective tissue fibers. The connective tissue cells are compressed and spindle-shaped or elongated. Fatty degeneration of the cells and lipomatous infiltration are of common occurrence. The pedicle is composed of the same structures as the tumor and may contain blood-vessels of considerable size, which may bleed freely when the tumor is removed.

In some cases embryonal round cells may be abundant and a distinct carcinomatous transformation of the tumor may occur.

Unless the tumor becomes inflamed or ulcerated there are no symptoms except the inconvenience caused by the presence of the growth. If ulcerated there will be pain and also an offensive discharge. On account of their size and location they may interfere with sitting or walking.

Treatment of this condition is very simple and consists in complete removal of the growth. An elliptical incision is made on each side of the growth and, if the pedicle is stout, a small flap of skin should be raised on either side in order that the margins of the wound may be brought together without undue tension. After the hemorrhage is controlled the wound is closed with sutures.

Lipomata are fatty tumors or abnormal masses of fatty tissue. They occasionally occur on the buttocks and in the perineal tissue about the anus. These tumors in no way differ from fatty tumors in other parts of the body. They develop in the subcutaneous tissues and may be single or multiple. They vary in size from that of a pea to tumors of considerable dimensions. Gant reports removing one from the right buttock, one inch from the anus, which weighed one pound and a half. These tumors are usually encapsulated, circumscribed, rounded or lobulated, and are frequently surrounded by a fibrous connective tissue capsule. On incision the surface presents more or less distinct lobulation. When a number of lipomata develop in the same individual it is not a condition of metastasis, but of multiplicity. Lipomata are most often seen in people past middle life or in advanced age. They appear as somewhat hemispherical elevations and rarely become polypoid. In some cases the tumor is more firm from the association of fibrous tissue; in others less firm from the nature of the fatty tissue itself or from associated myxomatous changes.

Microscopically lipomatous tumors resemble the normal fat except that the cells are larger, that is, they contain more oil than the normal fat cells. The blood-supply is about the same as in normal fat, though occasionally large vessels with thin walls are seen. Associated myxomatous or fibrous changes may cause a variation of the microscopic appearance. Lipomata may undergo softening from necrosis, but more frequently become calcareous in part or completely.

This is the most benign form of all tumors. However, recurrence sometimes takes place after complete removal. The only danger from this growth is its weight or position. It does not support the body in case of starvation.

Alcoholism may be mentioned as one of the **causes**, as it particularly

favors obesity. There also seems to be a hereditary or congenital predisposition in the formation of these growths.

On account of their size or location they may cause an inconvenience in sitting or walking, otherwise the symptoms are very few. If inflamed or ulcerated they may produce pain with a discharge of blood and pus.

Treatment consists in complete removal by making an incision over the prominent part of the tumor, extending down through the capsule. The fatty tissue is then removed, care being taken not to leave any of its offshoots. The wound is closed by means of sutures.

Cyst, as ordinarily understood, is a term applied to pathologic formations consisting of a more or less defined wall and inclosing liquid or semiliquid contents of a different character from the surrounding parts. The most common cyst about the anus is the retention cyst. Retention cysts are formed by the accumulation of secretions due to occlusion of the excretory ducts of a gland, *e.g.*, cysts of the sebaceous gland. Softening cysts may be found in this locality, but are very rare. They result from degeneration or softening of a pre-existing tumor from a hematoma.

Retention cysts are distinguished by the fact that they have a distinct connective tissue wall lined with epithelium. They are usually found upon hairy portions of the body where the skin is thick, as about the anus. The gruel or paplike contents is composed principally of epidermic cells, but also contains fat masses, and generally fat crystals and cholesterin, the fat and cholesterin being formed from the sebaceous glands. These tumors are usually round or ovoid and attached by a more or less well-formed pedicle of the same structure as the neoplasm. They vary in size from that of a pea to an orange, the average being about as large as a plum. These growths may become infected, resulting in disintegration or degeneration of their contents, with the formation of a cheesy or bloody, puslike material. They are covered by skin, fascia and connective tissue. Cysts are very rare tumors about the anus, but are occasionally found in this locality.

Fig. 144 shows a cyst, the size of a large hen-egg, that I removed from a man 52 years of age, three months ago. About four years ago he observed the beginning of this tumor; its attachment was at the anterior external anal margin. It developed very slowly, causing but little discomfort until five or six months ago. At this time it had grown to such proportions that there was interference in both walking and sitting on account of which he sought relief. The surface of the tumor was not in any way irritated or ulcerated, from which condition there would have been an offensive discharge. When I saw the patient the attachment occupied almost the entire space between the anterior anal

commissure and the base of the scrotum. The tumor was incised and a rather thin, sterile, cheesy-like material was evacuated. The greater part of the pendulous portion of the cyst wall was removed and the remaining portion of the sac was dissected out. The wound was closed by interrupted sutures.

The following is the report of Dr. Leon K. Baldauf, pathologist at the University of Louisville, with microphotographs: "The gross appear-



Fig. 144.—Perineal cyst. (*Hanes's case.*)

ance of the specimen shows a mass of tissue covered with skin measuring $4 \times 8 \times 4$ cm., and another mass of tissue measuring about $4 \times 4 \times 3$ cm. The inner surface of the larger mass presents a smooth appearance except for a slight elevation which measures 2×1 cm. On section, specimen shows outer covering to be of stratified epithelium, the external portion of which shows distinct cornification; beneath we find a connective-tissue stroma of true skin, and within this structure is another rather dense stroma made up of firm, fibrous tissue and smooth muscle fibers. Throughout the stroma, as well as in all the tissue beneath the epithelial covering, there are a number of vessels varying in size, with walls of varying thickness filled with red blood-cells. There is also a

definite cellular infiltration, these cells being for the most part round. Beneath the connective tissue stroma and corresponding to the lining of the cyst wall described is an epithelial lining varying considerably in thickness. It takes on the appearance of stratified squamous epithelium. The epithelial lining merges with the thickened area already described, which presents numerous thin-walled vessels filled with blood. The cells that are scattered throughout the tissue, especially that part bordering on the dense stroma, are round, irregular, and epithelioid in appearance. A number of multinucleated cells are also visible, the nuclei of some being found in the center of the cells and in others the arrange-



Fig. 145.—Section of perineal cyst from the case illustrated in Fig. 144.
(Photomicrograph, low power.)

ment is near the periphery. The giant cells are for the most part located around linear spaces, which probably have contained a substance that was subsequently dissolved away. They resemble spaces from which cholesterolin plates might have been dissolved. A number of plasma-cells with eccentric nuclei are also visible. A few cells, distinctly spindle shaped, with fairly large nuclei, which are likely fibroblasts, can be made out. The thickened area presents the typical arrangement of granulation tissue.

“Diagnosis.—Cyst of perineum; wall showing definite granulation tissue” (Figs. 145 and 146).

The Symptoms from these growths are few. If they have grown to considerable proportions there will be some interference in sitting and walking. The surfaces may become infected and ulceration follow, which results in tenderness and pain with a discharge of pus and blood.

Under **Simple Vegetations** are included venereal warts, papillomata, and condylomata acuminata, all of which expressions have practically the same significance. Venereal warts occur quite frequently about the anal region, especially in individuals in the lower walks of life. It is very important that we should be able to differentiate these vegetative growths from syphilitic condylomata and epitheliomata. I should say that the term "venereal warts" is more or less misleading, as they may be due to causes entirely independent of sexual intercourse.

They appear as small or large, discrete or confluent, moist or dry overgrowths. The favorite site for these warts is at the junction of the



Fig. 146.—Section of perineal cyst from case illustrated in Fig. 144.
(Photomicrograph, high power.)

anal skin with the mucous membrane (Figs. 147 and 148). The vegetations found here are more soft and succulent than those found upon the skin farther away from the anus. The soft variety is seen in subjects from 15 years of age to early adult life, while in those past middle life the hard variety is more frequently observed. The latter are firm, hard, sessile, less vascular and fewer in number, and resemble the chronic seed wart seen on the hands (Fig. 149).

The Cause of these vegetations, as stated above, is not always of venereal origin, though they are most frequently seen about the genitals and neighboring sites. They are particularly observed in subjects who have been affected with leucorrhea, gonorrhea, chancroids, and syphilis, which conditions have extended to the vicinity of the anus. Any condition that favors heat and moisture, together with uncleanness, may

be productive of these growths. They occur sometimes when none of these causes is apparent. It is contended by some that there may be a natural predisposition to warty development in these subjects. Vegetations or new growths are due to hypertrophy of the papillæ, increase in the epidermis and capillaries, and hyperplasia of the connective tissue.

The chief *symptoms* of venereal vegetations occurring at the margin of the anus are moisture, foul odor, excoriation, and pruritus. Fissures



Fig. 147.—Pedunculated papilloma of the anus. (Hanes's case.)

and ulcers may appear as a result of moisture and infection, when more or less bleeding and pain will be experienced. They may project like one or more threads or form discrete, protuberant excrescences. By confluence they may produce an overgrowth resembling a raspberry or cauliflower, or by pressure they may form flat and broad-based growths.

In the *diagnosis* we should be able to distinguish these vegetations from syphilitic condylomata and epitheliomata. Condylomata lata seldom appear as isolated syphilitic lesions, there being a history and other signs that usually enable us to determine the nature of the affection. It must be understood, however, that condyloma acuminatum may result from condyloma lata, both being present simultaneously. In such a case

the secretions from the syphilitic lesion stimulates papillary overgrowth or condyloma acuminatum in the neighboring skin. In epithelioma the subject has usually reached middle life, the surrounding structures are infiltrated, inguinal glands involved, tumors grow rapidly and ulcerate early.

Treatment of these growths consists in removing the cause—namely, the irritation. If there be an acrid discharge from the vagina or rectum, its cause is to be sought and removed. The parts should be kept scrupulously clean and dry by the use of antiseptic and astringent irrigations and astringent dusting powders, such as calomel, bismuth, zinc, lyco-



Fig. 148.—Papillomatous warts of the anus. (After Ball.)

podium, etc. If they fail to disappear under this treatment they may be cauterized with sulphuric, nitric or carbolic acid. The best treatment, by far, in these cases consists in anesthetizing the local parts with cocaine, or some similar agent, removing the growth slightly below the surrounding skin surface and thoroughly burning with the actual cautery. This procedure can be easily conducted with little or absolutely no pain to the patient, and is undoubtedly the most thorough method that can be employed.

Condylomata Lata are true syphilitic vegetations and appear as red spots upon the skin. A slight effusion occurs under the epidermis, but not in sufficient amount to form a vesicle. Later the epidermal layer is removed by friction or otherwise, and a raw surface is exposed upon which a moist grayish deposit is formed. The elevation of the surface is due to hypertrophy of the superficial layers of the skin

which is the source of broad, flat elevations of the new growths. Condylomata lata are the most frequent syphilitic lesions in the neighborhood of the anus. Wallis says this form of syphilis is almost the only one seen at St. Mark's Hospital. Around the anus these lesions often have the appearance of rounded disks and may be single or in aggregations. They have granular or elevated surfaces that are of a reddish or grayish color, and are of such peculiar appearance that there is but little difficulty in recognizing them when once seen.

As was stated under non-syphilitic vegetations the irritating

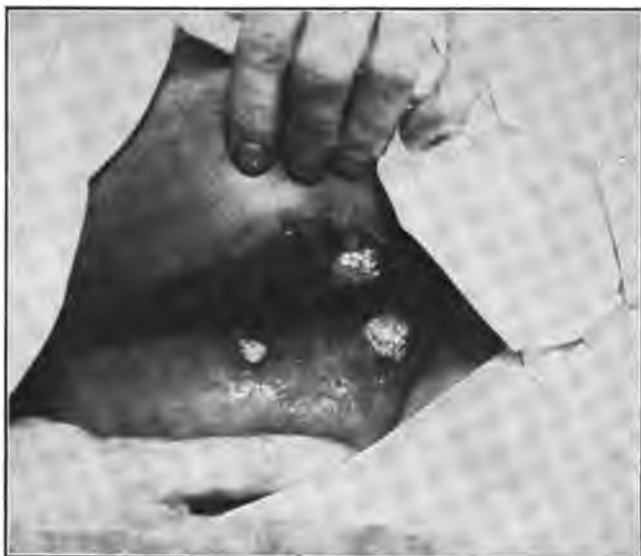


Fig. 149.—Condylomata acuminata of the buttocks. (*Hanes's case.*)

secretions of the syphilitic condylomata frequently give rise to warty growths, in the adjacent skin, which are not syphilitic. When the moist lesions are subjected to friction and not treated they may become ulcerated. Occasionally distinct papillary overgrowths may follow ulceration and large, cauliflower-like, warty tumors may be formed.

Of course, systemic *treatment* should be instituted at once. Dr. Lewis Adler has noted good results from the use of salvarsan. Dr. Bronner stated that these lesions yield especially well to the hypodermic injections of salicylate of mercury and salvarsan. Locally, cleanliness and dryness of the parts must be rigidly observed. Black or yellow wax applied on cotton is a simple and efficacious treatment.

The parts should be kept separated by gauze to prevent coaptation of adjacent surfaces.

When the growths are large and of the papillomatous type they may be carefully cauterized with some chemical cauterizing agent, after which the parts are cleansed and kept as dry as possible. Calomel, boric acid, bismuth subnitrate and starch are some of the dusting powders found to be of greatest service.

BENIGN TUMORS OF THE RECTUM AND COLON.

Adenomata.—These new growths are the most important benign tumors from the standpoint of the patient and the surgeon. They are composed chiefly of epithelial tissue growing in connection with secreting glands, and when they occur in the alimentary tract the new epithelial cells correspond to the normal cells found in the follicles of the intestinal mucosa. When the epithelial proliferation grows into the lumen of the bowel and directly away from the basement membrane the new growth is a simple adenoma. On the contrary, if the proliferating cells grow toward and invade the basement membrane, mucosa, and surrounding structures, then it becomes a malignant tumor, adenocarcinoma, which is the typical form of intestinal cancer.

Adenoma, as well as adenocarcinomata, may be found anywhere in the intestinal tract, though they occur much more frequently in the rectum and sigmoid than in other parts of the intestinal canal. It has been argued by some that adenomata do not occur more frequently in the rectum and sigmoid, but appear to do so on account of these parts being more easily explored during life than other divisions of the bowel. The experience of those best qualified to pass judgment on this question, however, is to the contrary.

Degeneration of adenomata into malignancy is a possibility that lends a very serious phase to these tumors. Simple or discrete adenomata rarely, if ever, develop malignant tendencies, the exception possibly being in the sessile type of tumor. Tuttle says no case is on record where a discrete and well-pedunculated adenoma showed malignant transformation. Since the type of adenomata found in children is of the pedunculated variety we seldom find malignancy in these cases. Of course, the question of age has its influence also. As we will see later, multiple adenomata are the tumors most prone to malignant transformation.

The accompanying photomicrographs (Figs. 150 and 151) show sections of a specimen recently removed from a patient 63 years of age. The

tumor was located in the rectum, on the posterior wall two and a half inches above the internal anal orifice. This growth was in a state of cancerous degeneration as shown by microscopic examination. It was impossible, from clinical examination alone, to determine the exact nature of the tumor. The neoplasm had a sessile attachment, was fairly firm to the touch, with a very slight tendency to nodulation. It was rather firmly adherent to the surrounding structures and the surface was superficially ulcerated at various points. The patient was not disposed to submit to a radical removal at the time, but was anxious to have the growth removed as well as could be done by



Fig. 150.—Malignant adenoma of the rectum. (Photomicrograph, low power.)

curetting, cauterizing, etc., which I did. The local symptoms were very greatly relieved and his general condition improved rapidly. This case represents malignant degeneration of a sessile adenomatous tumor of the rectum.

Pathological Report by Dr. Leon K. Baldauf.—Specimen consists of a section of dense connective tissue infiltrated with a number of irregularly shaped and located glands. These glands are made up of several layers of high columnar epithelial cells, with nuclei situated near what should be the basement membrane. The lumina of the glands vary considerably in shape and appearance, owing to their number and irregularity. In places the lumen is represented by a large circular space and the epithelial lining is somewhat flattened out. In these instances there is probably cystic dilatation. In some of these cystic glands there is a papillary outgrowth, the fine connective-

tissue stalkwork being covered with an irregular arrangement of high columnar epithelial cells. In sections the epithelial and connective stroma stains indistinctly; at these points there is a hemorrhagic infiltration and deposit of pigment. No distinct polymorphonuclear infiltration is visible.

Diagnosis.—Malignant adenoma of the rectum.

Ball says "there is a close analogy between the adenomatous growths of the intestinal mucosa and the cutaneous warts." He further says that "the increase of the papillæ of the skin and overgrowth of epithelium on the surface of a wart has its exact counter-



Fig. 151.—Malignant adenoma of the rectum. (Photomicrograph, high power.)

part in the formation of a small adenoma; both occur more frequently. There is a tendency in both for the surface to be increased by tuberculation and fission. The tendency to become pedunculated, although more frequent in intestinal adenoma, is not uncommon in cutaneous papilloma, and as the cutaneous wart, after existing for many years without apparent change, may spread into the deeper tissues and become a malignant epithelioma, so we find that cancer of the rectum may have been preceded for a long time by a purely benign adenomatous growth, particularly if the tumor is one of the sessile and non-pedunculated varieties of simple adenoma. Another point of resemblance between cutaneous warts and intestinal adenoma is that both are influenced by heredity; numerous instances are recorded of several members of the same family suffering from adenomatous growths in the rectum, and we know that it is common for cutaneous warts to

show the result of similar hereditary influence." As we find warts more frequently on certain parts of the cutaneous surface, so we find portions of the mucosa more frequently affected with adenoma than other parts.

Simple Adenomata are generally pedunculated and polypoid in shape, with a pedicle varying in length from 2 cm. to 8 or 10 cm. This type of new growth is usually found in children, though they may be occasionally seen in adults. It is purely the discrete form of polyposis and, as usually observed, the tumors do not exceed three or four in number. The expressions "simple adenomata" and "simple polyposis" will be used interchangeably. It must be understood, however, that polypus is a general term applied to pedunculated tumors attached to mucous membranes and has no reference to any particular type of histological growth. Nodes may appear beneath the skin or serous membranes and in the course of time become so heavy as to be pedunculated, under which conditions these tumors may be also called polypi. And, again, when we later in this chapter refer to multiple adenomata it will be seen that polypoid growths exist in this condition, but not of the simple discrete type.

Simple Polypoid tumors begin as small nodules of the mucous membrane projecting into the lumen of the bowel, and as the cell proliferation continues in a direction away from the submucosa the growth becomes prominent and rounded while its base becomes narrowed into a pedicle. When the pedicle is once formed it tends to elongation as the growth is forced down into the lumen of the bowel by straining and fecal contents dragging upon it. When the act of defecation is completed it is retarded in its return to its original position on account of the apposed intestinal walls pressing against it. A patient once said to me that he could feel the tumor slowly drag back to its original site after the act of straining had been completed.

The Pedicle varies in size and length according to the amount of traction to which it is subjected and the length of time the tumor has existed. The length of the pedicle varies from a fraction of an inch to several inches. It may be thin and round or broad and straplike. It is made up of the mucous and submucous coats of the bowel and the vessels that supply nutrition to the tumor. If it is of sufficient length, the growth may be extruded through the anal canal and held below the anal muscles on account of their contraction on the pedicle, thus preventing the growth passing back into the rectum (Fig. 152). If the pedicle is very small the tumor may be torn away from its attachment when extruded, pain and bleeding being of little consequence.

When the pedicle is large and has sufficient strength to pull the

polyp well into the external anal orifice after it has been extruded, it may be mistaken for a prolapsed internal hemorrhoid, especially in the adult. In a child the mother, in almost every instance, considers the tumor to be a prolapsed bowel. A case of this kind came under my observation two years ago. The mother said her little boy's rectum had come down three times within the past few months and that she had much difficulty in pressing it back into its normal position. I gave the little patient an enema, but he was unable to force the mass out. I then placed him in the inverted position and introduced

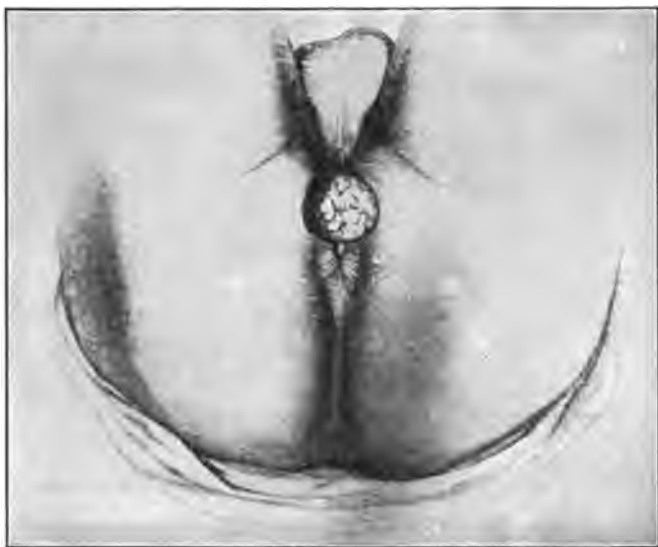


Fig. 152.—Adenoma protruded through the anus and attached by a long pedicle. (After Ball.)

a short, small proctoscope. After the instrument was passed a short distance into the rectum the lumen was found to be occluded. A small piece of cotton, held by an alligator forceps, was pressed gently against the wall of the rectum in various directions beyond the distal end of the proctoscope; immediately the air rushed in and completely distended the lumen of the bowel. There was no further difficulty in understanding the exact nature of the trouble, as a polyp, the size of an average plum, was seen attached to the rectal wall about an inch and a half above the internal anal orifice.

The Number of tumors present in different cases is by no means constant. When the growths are distinctly pedunculated and do not exceed three or four in number the case is usually one of simple

adenomata. When, however, the number is increased and there is less perfect pedunculation the condition is considered one of multiple polyposis.

The Size varies from that of a raspberry to a walnut. They may be so small as to occasion no marked symptoms, or they may be large enough to cause complete obstruction of the bowel.

The Surface of a polyp may be smooth or rough and irregular, resembling a dewberry, or it may be increased by tuberculation and, in other instances, the surface area is still more largely increased by deep divisions. Ball says that "under these circumstances papillary adenomata may become what has been described as villous tumors."

The Shape may be globular or elongated. The consistency varies, depending upon the degenerative changes which have taken place and the amount of connective tissue which they contain. Some are soft and gelatinous and bleed very easily, while others are hard and firm.

Of polypi seen in the intestinal canal four-fifths are located, it is said, in the rectum and sigmoid. They are more usually encountered from one and one-half to two and one-half inches above the internal anal orifice. Occasionally they may be found at a much greater height.

The Symptoms of polypi, if small and not involving the anal canal, are of little consequence. On the contrary, the sphincter muscles may become very irritable if the tumor passes into the anal opening, or is protruded. In the latter event the polyp becomes congested, the surface abraded and infected, the rectal mucosa, as a consequence, becomes catarrhal with the production of mucus and perhaps slight bleeding from the surface of the tumor. Hemorrhages from the bowel in children suggest the presence of a rectal polyp, as a child seldom has piles. On the contrary, hemorrhoids would be suspected as the cause of hemorrhage in the adult.

Very large polypi may cause a sense of weight and uneasiness in the rectum. They may cause obstruction to the lumen of the bowel or, by pressure, interfere with urination or parturition. When situated high in the bowel they have been the cause of intussusception and in account of the continued peristalsis they may stimulate.

There is little doubt that many polypi disappear after childhood; but whether, like warts, this disappearance is without any explained cause, is not known. It seems probable, however, that the pedicle becomes gradually thinner and more elongated until the tumor is eventually torn off at the time of defecation. This is a reasonable explanation of the sudden cessation of repeated attacks of hemorrhage in children as they advance in years.

In the child, especially, there is a frequent desire to go to stool, which is accompanied by more or less tenesmus. I am confident that the presence of an ordinary polyp in the rectum of a child or adult will cause only slight symptoms unless there is infection with consequent catarrh, erosion and may be ulceration. These conditions account for the hemorrhages, mucus, pus, tenesmus and irritable condition of the anal muscles, especially if the tumor engages in the anal orifice or protrudes through the anal canal. I am sure we fail to recognize the importance of infection of the mucous membrane, in our explanations of the presence of symptoms in some and not in others who are affected with these tumors. It is not infrequent, when inquiring into the history of an adult case, that the patient will say he had no important symptoms about the rectum and suddenly a tumor protrudes when at stool. In such a case there was no irritation by infection, and the tumor was no more offensive than a mass of fecal material. The hard fibrous tumor causes more pain when protruded and is more liable to cause ulceration, etc.

It must be borne in mind that considerable bleeding may occur at any single time or there may be frequent small hemorrhages which will produce a profound anemia.

It is quite reasonable to suppose that in multiple tumors there is more liability to traumatism and infection with diarrhea, tenesmus, hemorrhage, mucus, pain in the lower abdomen, especially on left side, and in many instances profound emaciation.

I saw a boy a few years ago who had a rectal polyp the size of an olive that prolapsed upon the least exertion when in the squatting position. The bowels acted from two to four times a day ordinarily, but when there was very slight intestinal stimulation he had from four to six evacuations each day with considerable straining. On account of the latter symptom a considerable rectal prolapse was developed. Soon after the polyp was removed the prolapse ceased to appear.

The Diagnosis of ordinary polypus is very easy, if the proper method of examination is employed. An extruded polyp might be mistaken for a prolapsed pile, but grasping the tumor between the thumb and fingers and having the patient strain down, at the same time making firm traction on the polyp, will make the diagnosis easy. The pedicle will always reveal the nature of the growth. Any mobile tumor that can be felt above the internal anal orifice, or higher up in the bowel, cannot be a hemorrhoid. The only portion of the rectal mucosa that participates in pile formation is that at the internal anal orifice, and could not be mistaken for a polypus; first, because the pile is not a

distinct tumor when above the sphincters, but conveys the sense to the palpating finger of redundant mucous folds with no pedicle; second, a polyp has a distinct pedicle and is more or less a firm globular tumor.

Mollière says in making digital examination for polypi it is advisable to pass the finger its full extent into the bowel and then gradually withdraw it, sweeping all along the rectal wall as it is withdrawn. By so doing the finger will hook over the pedicle and the tumor will be found. If the examination is made from below upward the tumor may be pushed up out of reach.

Under ordinary circumstances it is far more satisfactory to examine cases of supposed polypi with the proctoscope. If the patient is inverted by hanging over the edge of a bed or an ordinary table with the folded elbows resting on the floor, or any support, the position will be comparatively easy and the bowel thoroughly distended when the proctoscope has been introduced and the obturator withdrawn. When digital examination for polypus is alone depended upon, one cannot feel certain a small growth has not escaped his finger. On the contrary, there can be no doubt when a plain view of the bowel is obtained through the rectoscope. Where there is straining with dysenteric symptoms the proctoscope will settle the question as to whether the symptoms are due to polypus or other causes.

The Treatment of an ordinary polyp is comparatively simple. If the growth is protruded and for any reason it cannot be at once removed it should be placed back in the rectum. If the tumor is large and the anal muscles are hypertrophied by continued irritation, it is sometimes difficult to introduce the polyp back into the bowel. It has been my observation that it can be done with least difficulty by inverting the patient. In this posture the weight, which the perineal floor ordinarily supports, is entirely removed and as a result the normal physiological tone or contraction of the pelvic diaphragm is very much diminished. This fact can be easily demonstrated by an effort to introduce any object through the anal muscles into the rectal pouch when the subject is in an erect posture, and then introducing the same instrument when the patient is inverted. On account of relaxation of all the perineal structures in the inverted position, tumors of any kind that have been protruded can be replaced with much less difficulty. Of course, it must always be borne in mind that pressure upon the growth should be gentle, but gradually increased until the tumor is replaced.

The removal of polypi may be done by one of various methods. The selection of any particular method can be determined by the

characteristics of the tumors, the age of the patient and the personal preference of the operator. The ligature, clamp and cautery, snare, torsion or the angiotribe, as advised by Lynch of New York, are the principal methods employed. It is my custom to anesthetize children; not that the procedure is a painful one, but it is done to overcome the excitement and obtain complete relaxation. The tumor can, in the majority of instances, be brought down by slight traction until its attachment to the rectal wall can be easily observed. The pedicle can then be ligated or clamped and cauterized. If the pedicle is broad and thick it is a wise precaution to transfix and ligate. In adults there is no reason, in an average case, for giving an anesthetic. There being practically no sensory nerve supply to the rectal mucosa, little pain is experienced except that which may occur about the anus. To relieve this pain a 20 per cent. solution of cocaine on cotton can be applied to the anal lining after the patient has been inverted. A large proctoscope can then be introduced with very little discomfort to the patient. If there is any kind of a growth attached to the wall of the rectum or lower half of the sigmoid it can be plainly seen. If the pedicle is small it can be drawn away from the mucosa toward the lumen of the bowel and then severed by an electric knife. The stump should be well cauterized with the same instrument, which will remove any danger of hemorrhage. If the pedicle is large and there is danger of hemorrhage, it should be transfixed and ligated. If the attachment is too high to ligate, it is very easy to clamp the stem with long forceps and allow them to remain in position for twenty-four hours, after which they can be removed with perfect safety. Of course, forceps must be used that will allow the proctoscope to be removed after they have been applied to the pedicle. For this purpose forceps may have detachable rings or, what is better, they should be made without rings. They are much less expensive and serve in such cases just as good a purpose. If tumors are to be removed high up in the bowel such instruments should always be at hand. There is no method by which hemorrhage can be so easily controlled as by the use of the clamping forceps. The operator must be sure before attempting their employment that they can be manipulated through a large proctoscope.

Of course, the tumor is to be brought down and its attachment exposed, if possible, without the use of any kind of proctoscope. After thoroughly relaxing the sphincter muscles it is surprising how well the attachments of polypi can be exposed in many instances.

The Treatment after removing polypi consists in keeping the bowels confined for two or three days, after which a moderate dose of castor oil or some saline should be given. Just before the bowels act it is

well to give an injection of cotton seed oil, and, if necessary, a mild antiseptic injection can be given for a few days. Do not inject more than 12 or 15 ounces at the time of each treatment. The object is not to excite undue peristalsis, but to cleanse the lower bowel.

It is advisable to examine, from time to time, the seat of attachment of the growth in patients who have passed middle life. Any induration about the old attachment or a disposition to recurrence has a grave significance and calls for the institution of radical measures.

Multiple Adenomata.—These are the most extraordinary and interesting benign growths that occur in the large bowel. Multiple polypi are usually seen in adults, though they occasionally occur in children. They may be found anywhere along the intestinal tract, including the stomach, but they are most frequently observed in the rectum and the lower extremity of the sigmoid. They may be seen in the colon alone, but the rectum is usually affected also when these tumors are present higher up in the large intestine. While it is said that multiple polypi may exist in the rectum alone it is certainly a very rare occurrence, the lower extremity of the sigmoid being affected in almost every instance. They occur with greater frequency in those portions of the bowel where there is a tendency to intestinal stasis.

The number and size vary considerably in different cases. They may be quite small and so numerous that the entire mucous membrane of the colon may be affected or they may be large and limited in number.

Multiple adenomata really occur as two distinct types of adenomatosis; in one the colon is almost completely covered with purely sessile or partially pedunculated growths and is well illustrated by Mr. F. Wallis's (Fig. 153) and Lilienthal's cases. In Wallis's case the disease involves the entire large bowel, a part of the small intestinal tract and the stomach, while in Lilienthal's case there seemed to be an involvement of the colon only.

The other type of polyposis is more common than the one just described. In these cases there is a tendency to pedunculation, though a great many sessile tumors may be present. It seems that the pedunculated tumors have grown out from those that are sessile and as a result the pedicles are short and thick and the tumors small, though in rare instances the pedicles may be long and the tumors quite large.

Under the title of "Carcinomatous Polyposis of the Colon" Dr. Babler reported an unusual case of multiple tumors (Fig. 154). The entire colon from the cecum to the upper extremity of the sigmoid was thickened and polypoid growths of various sizes, varying from a pea to a small hickory nut, were found scattered throughout the large

bowel. The tumors were firm and invaded the mucosa and submucous tissues, which were very much congested and in which numerous hemorrhages were noted. Microscopic sections revealed carcinomatous evidence in all the growths examined. The type of tumors was that of adenocarcinoma.

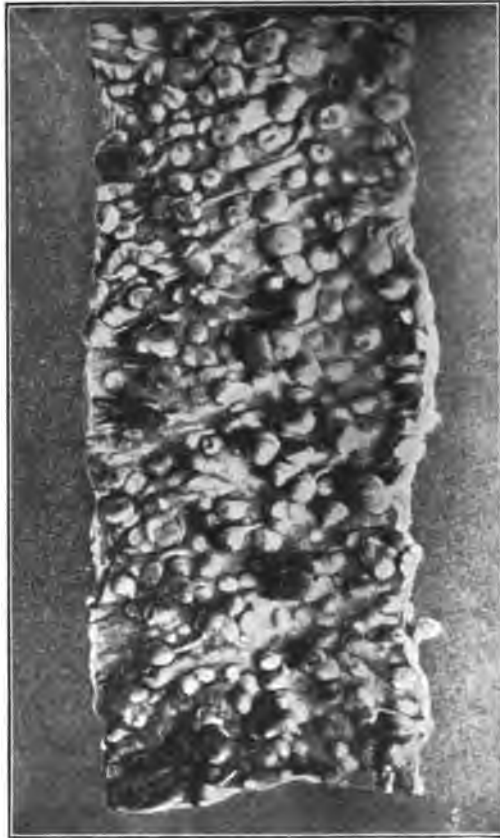


Fig. 153.—Multiple adenoma of the colon. (After Wallis.)

This report reveals an unusual condition in that the entire wall of the colon was carcinomatous, including the mucous and submucous coats, although many nests of carcinoma cells were present in the lymphatic spaces of the muscular layers.

Etiology.—The cause of multiple adenomata is obscure. It is believed by some that the congenital misplacement of tissue elements plays an important part and that traumatism is a factor in the etiology by exciting proliferation of misplaced tissue elements.

Meyer holds that intestinal polyposis is congenital and says the early manifestations are to be found in the connective tissue elements. He regards the process of epithelial changes as a secondary condition due to inflammatory stimulation.

It is held by Lebert and Schwab that the connective tissue proliferation is primary, but this is the result of chronic irritation and not due to any congenital condition. They believe the beginning of the process is in the formation of new vessels.

Hauser is a strong advocate of the theory that multiple polypi

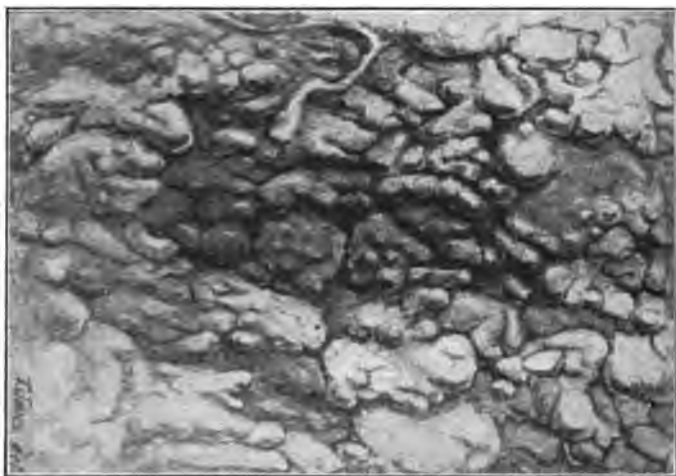


Fig. 154.—Carcinomatous polyposis of the colon. (After Babler.)

originate through a primary proliferation of ordinary glandular structures as a consequence of continued irritation. He believes that the changes in the glandular epithelium differs in no way from cancerous degeneration.

Ball says that the occurrence of these growths may in some instances be due to a deposit of the ova of *Bilharzia hamatobia* in the mucous membrane, and, also, that other intestinal parasites may produce new tumors by irritation (Fig. 155).

Microscopic Examination shows the smaller and newer tumors to be composed of granulation tissue which contains numerous small blood-vessels. They originate beneath the mucous membrane. In the pedunculated variety, which seems in many instances to be a later stage of sessile tumors, the polypi are composed of simple granular proliferation tissue.

Malignant Degeneration.—It is a well-known fact that there is a distinct tendency for multiple adenomata to become malignant. As shown in Babler's case, all the tumors in the colon were of a malignant type. In many instances a number of tumors in the same case may be simple and others malignant, or it may be observed that the same tumor possesses both simple and malignant characteristics. There can be no doubt that the multiple variety have much the greater tendency to malignant transformation. Some authorities believe that it is only the multiple type of tumors that are subject to such generation.

The Symptom in multiple adenoma that is most constant and annoy-



Fig. 155.—Multiple adenoma of the rectum due to deposit of the ova of *Bilharzia hæmatobia*. (After Ball.)

ing is diarrhea. When the tumors are numerous in the rectum and lower portion of the sigmoid, tenesmus and griping pains are often marked. The diarrhea comes on gradually, but when it becomes severe no palliative remedies have any marked influence over it. The bleeding, just as does the diarrhea, comes on slowly and increases in amount until in the advanced stages of the disease, when the patient may often pass only blood and mucus. These subjects become very much emaciated from the pain, diarrhea, loss of blood, etc., and if there is an unusual amount of hemorrhage anemia is marked. There is always pain and tenderness in the left side and often the entire lower abdomen is sensitive. If the tumors are not numerous and develop slowly slight bleeding and diarrhea may exist for a number of years. Mummery mentions a case in which these symptoms were present for ten years.

Where there is a great deal of straining, prolapse of the rectum or

large internal hemorrhoids may be associated with these growths. Some twenty months ago a gentleman consulted me for internal hemorrhoids. After he was examined, and large piles found to be present, I learned from interrogations that he had a diarrhea and considerable straining with mucous and bloody discharges. He was placed in position and examined with the proctoscope. Eighteen or twenty mucous polypi were seen in the rectum and sigmoid. They were the size of a medium olive, the first being situated three and a half inches up in the rectum and those occupying the highest position were five inches up in the sigmoid. The mucous membrane of the rectum and sigmoid was in an active catarrhal state, which accounted for the straining, blood and mucus present. In this case the hemorrhoids were certainly the result of straining due to adenomata. When the polypi were removed and the rectum irrigated for a few weeks the piles disappeared. A diarrhea, unaccompanied by straining, tends but little toward the production of piles; on the contrary, diarrhea with straining is a very potent factor in producing hemorrhoids.

The Diagnosis in this condition should be very readily made out. If it is convenient, the lower bowel should, under all ordinary circumstances, be cleansed by an enema of plain water. This having been done, the patient is placed in the proper posture and examined with an ordinary proctoscope.

If it is desirable to remove one or more tumors for microscopic examination, to ascertain the possibility of malignant transformation, it can be done, but it should always be borne in mind that a single benign growth may be found adjacent to one with malignant degeneration.

We cannot emphasize too much the importance of making a thorough examination as soon as the patient presents any kind of suspicious symptoms. Digital examination may be made to ascertain something of the condition of the lower extremity of the rectum, but it cannot be relied upon except as a preliminary to a thorough examination. If it were imperative that definite knowledge should be obtained relative to the extent of the polypi an exploratory abdominal section might be advisable.

The Treatment first consists in the administration of simple, plain nutritious food, avoiding all articles of diet that are found to be irritating to the digestive tract.

The drug most useful is opium. It should be given in such doses as each case may demand. Opium alleviates pain and lessens the diarrhea, for a time, which gives the exhausted sufferer at least a brief period of rest and comparative comfort. Since the mucous membrane of the bowel is in a state of inflammation some relief can be obtained by the injection of bland solutions, such as flaxseed water with boric

acid or tincture of opium added. Any mild astringent may relieve the distress to some extent.

It is believed by some that it is inadvisable to resort to any kind of surgical interference in these cases except when the tumors in the rectum are well pedunculated. It seems hardly probable that any one would attempt to remove ordinary sessile tumors if they were numerous and extended high up in the bowel. Under such conditions there would undoubtedly be great danger in stimulating malignancy. When tumors are well pedunculated I cannot believe that it would be more harmful to the patient to remove them than to allow them to remain in the bowel. A number of cases have been reported where tumors have been reduced in number and size and the symptoms markedly relieved by irrigations with salicylic acid, salicylate of soda, boric acid, and various other agents.

Earle says: "Where they have undergone malignant degeneration, it seems to be the consensus of opinion that the only thing to give permanent relief is to excise the entire affected area of the bowel."

Colostomy, cecostomy and appendicostomy have been done with results depending on the severity of the case and the parts affected. Anastomosis between the ileum and sigmoid has been done with subsequent extirpation of the colon.

Since radical operation, in the way of removal of any part of the large intestine, is a dangerous procedure, it is not to be recommended except in the most urgent cases.

Villous Adenomata occur in the rectum and are similar to those found in the bladder and kidney. The disease is comparatively rare, though quite a number of cases have been reported. Cripps reports having seen more than 25 in twenty years. Allingham in his extensive experience saw but 17 cases; Godsall and Miles saw 12 cases. It seems that English surgeons have met with this variety of tumors much more frequently than have American surgeons. Dr. Mathews, in his wide experience, has reported only 1 case and Van Buren reported 1. Other American surgeons have reported only a few cases. They are of slow growth and consist of a spongy, slippery mass with long, villous processes that bleed easily and in some cases very freely.

The *Attachment* is to the superficial surface of the mucous membrane of the intestine, usually by a stem which is broad rather than round. Of course, in some cases the stem is very short, and in rare instances the attachment is purely sessile, while other villous growths may have pedicles two or three inches in length. Allingham is of the opinion that the pedicle is the result of the weight of the tumor pulling on the mucous and submucous membranes, thus forming a pedicle by elongation rather than by development. When they arise from any portion of the bowel

that is covered by peritoneum care should be taken, when the pedicle is ligated, that the peritoneum is not included in the ligature. The pedicle may become sufficiently lax to allow the growth to protrude through the anal canal. Under these conditions the growth is very much congested and bleeding is a common symptom. The pedicle is composed of mucous membrane, submucous tissue and blood-vessels, or it may contain, in addition, considerable fibrous tissue, which renders it much harder than in the first instance.

The Size of these growths varies from a pea to that of an egg or, as Allingham and others have reported, it may be the size of the fist or even larger.

The Etiology in this disease is not understood. Age seems to be a predisposing factor. The greater number of cases reported are over 50 years of age. Constipation is also given as a possible predisposing cause. Since irritation is considered to be the most potent factor in the production of simple adenomata it seems that it would be of equal importance as a causative agent in the production of villous adenomata. It is found about equally in both sexes.

The pathological structure of these growths is identical with that of the adenoid polypus; that is to say, it is composed of glandular tissue. The fibrous stalk on entering the base of the tumor expands, forming a central nodule of fibrous tissue. Radiating from this central nodule are fibrous branches of greater or less extent. These form the central supporting stalks of the lobes and lobules, composing the surface of the growth. From these main branches fibrous twigs are given off which, expanding into a delicate retiform tissue, furnish the supporting framework of the epithelial covering. This covering consists of a single layer of columnar cells arranged in a bipenniform manner on the retiform tissue so as to form a beautiful leaf-like or feathery surface when examined under the microscope.

One of the early *symptoms* of this condition is often constipation. In the beginning of the disease there may be very little mucus present, but in the later stages the abundant discharge of a glairy mucus is one of the most prominent symptoms. Allingham reports that in some cases the mucus may pass through the anal opening involuntarily. He says that it is an exaggeration of the normal secretion of the mucous membrane by the villi which, of course, form a part of the tumor. The pain is not acute in character, but is dull and aching, there being a sense of weight in the pelvis. If the tumor is protruded and appears below the sphincter muscles much pain and discomfort may be produced on account of the dragging sensation upon the rectal wall and the irritable contraction of the anal muscles. Pain is usually increased when the

patient is in the upright posture. If the tumor has developed to considerable proportions and the rectal mucosa has become irritated there is almost a constant desire to evacuate the bowel, in which cases straining is an annoying symptom. The amount of bleeding in villous tumors is variable. In most instances there is sufficient blood present to stain the discharges, while in some cases hemorrhages may be very profuse, causing marked pallor and anemia. If the growth is protruded it becomes congested, which may materially increase the amount of hemorrhage. The general symptoms depend upon the hemorrhage and the discharges. The patient loses flesh, is anemic and has interference with the digestive processes. The hemorrhages may be so profuse as to cause dizziness or fainting, as was noted in Dr. Mathews's case.

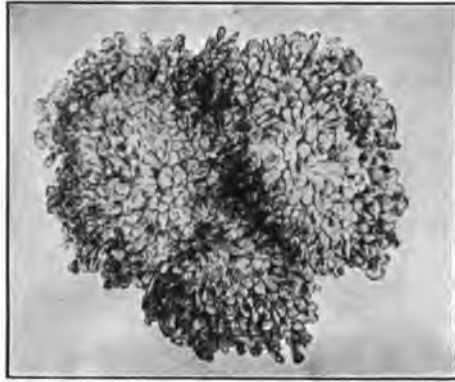


Fig. 156.—A villous tumor. (After George J. Cook.)

The Diagnosis of these growths is made without much difficulty. They are soft, slimy and velvety to the touch and are slightly elastic. There is no induration in the rectal mucosa surrounding the attachment of the pedicles to the bowel wall, which differentiates them from cylindrical epithelioma. In the bowel they have a bright red color in contrast to the livid appearance when prolapsed. If there is any doubt in regard to the diagnosis it can be eliminated by placing the patient in the proper position and making direct observation through a large proctoscope (Fig. 156).

The Prognosis in conditions of this kind is by no means encouraging. Mr. Allingham says that when the second edition of his book was published it was his opinion that these tumors did not return when removed. He says in the sixth edition that he is obliged to modify that opinion as he has since seen cases in which epithelioma replaced the villous growth. One pathologist reported probable malignancy and another gave

a negative report. He says this represents the pathological situation of these tumors. In this same case he reports that after some months there was a recurrence which microscopically proved to be carcinoma.

Mr. Mummery says villous adenomata occur in the colon, but they are seldom detected before they become malignant. In most cases when removed they are found to show well marked malignant changes and are, therefore, usually classified as malignant tumors. The literature on rectal villous tumors shows a distinct recurrence in many instances, which undoubtedly points toward a malignant tendency.

The Treatment of villous tumors should be conducted with full knowledge of the fact the recurrences are frequent and that malignant



Fig. 157.—A villous tumor of the rectum, which, after removal, was turned inside out for the purpose of showing the growth. (After Wallis.)

transformation is always a dangerous possibility. In my opinion, it is only in those cases where the pedicle is very small that the tumor should be ligated. If the attachment is within two or three inches of the anal opening, by thoroughly dilating the anal muscles, the rectal wall can usually be drawn down sufficiently well to dissect out the broad attachments of these tumors and by so doing reduce the possibility of recurrence. In every instance where it is possible to dissect away these attachments from the rectal wall it should be done. It is far better, for the patient, to practice radical measures in the early stage of the growth than to be forced to such a procedure under very much less favorable conditions (Fig. 157).

When the growth involves a large area of the rectal wall it should be treated, from an operative standpoint, as a malignant tumor. Whatever the method of treatment determined upon it should be instituted without delay.

Diverticula.—In making a positive diagnosis of polypi it should be borne in mind that a diverticulum, having its origin in the colon, may have a sufficiently long pedicle to permit its base, or tumor, to descend to and out of the rectum. Mathews, in his book on "Diseases of the Rectum, Anus, and Sigmoid Flexure," gives a beautiful illustra-



Fig. 158.—A diverticulum of the colon distended with fecal matter. (After *Mathews*.)

tion of this in a photograph taken from life (Fig. 158). He says: "This very unique case, which was referred to me for operation, was a young married woman, with following history: Aged 25; married six years; one child aged 4 years. A short time after her child was born she noticed a protrusion which occurred suddenly from the rectum. During the time that it was protruded she was greatly nauseated and suffered a great deal of pain. Her physician was sent for and he

reduced the protrusion and all reflex symptoms disappeared. A few months thereafter the same thing occurred and the same treatment afforded relief. From this time on, at occasional intervals this protrusion would take place until it became a source of embarrassment and pain. Her physician anesthetized her and decided that it was neither a hemorrhoid nor polyp and on his advice she came to me. After a long walk the tumor made its appearance. It was as large as a small orange, the shape of an egg and covered by mucous membrane. The next morning she was anesthetized, the tumor readily brought into view, a pedicle could be traced into the sigmoid flexure, yet no point of attachment could be located. The pedicle was ligated as high up as could be reached and the tumor cut off. She made a quick recovery. When the tumor was cut into it was found filled with decayed fecal matter and pronounced to be a diverticulum of the colon."

Diverticula, originating in the rectum proper, are of rare occurrence. Many state that they cease to appear with the appendices epiploicæ at the upper extremity of the rectum. We know that diverticula most frequently appear in the sigmoid, but on account of the proximity of this portion of the bowel to the rectum these tumors may descend into the latter. In the case Dr. Mathews reports, the extraordinary feature is the fact that the tumor was of sufficient length to present through the anus.

True Fibromata of the rectum are of infrequent occurrence. They originate from the connective tissue of the submucosa and, like adenomata, are more or less pedunculated as a rule, but may remain in the rectal wall. Fibrous tumors originating well up in the rectum are, in some cases, composed almost entirely of fibrous tissue and the tumor has a complete investment of mucous membrane, while if it arises from the lower part of the anal canal it is covered with stratified epithelium. These growths are usually situated within $2\frac{1}{2}$ inches of the internal anal orifice.

Tuttle says those tumors known as fibrous polypi of the rectum are not in reality true fibroids, but are polypoid growths in which the fibrous tissue is varying in amount, being mixed with glandular and other elements.

They may be single, or two or three growths varying in size may exist at the same time. When multiple fibroids exist they usually arise from the anal region, as from an internal hemorrhoid in which the dilated veins have become thrombosed and subsequently undergone fibrous degeneration, or they may be due to hypertrophy of the papillæ normally found in the valves of Morgagni. All tumors in this

region tend to pedunculation on account of the downward force exerted upon them during defecation.

They may vary in size from a pea to an orange. If the pedicle is of sufficient length and the tumor is not exceedingly large, it will prolapse as other polypoid tumors when there is straining. These growths when composed partially of glandular and other elements may contain cavernous spaces (Fig. 159).

The Symptoms of pedunculated fibromata are very similar to those of pedunculated adenomata. These tumors seldom occur in children,



Fig. 159.—Fibrous tumors of the rectum. (After Ball.)

the reverse of which is true in adenomata. The typical fibroid is hard and sometimes nodular. If the tumor contains a great deal of glandular tissue, it may later become soft and a jelly-like mucus may be present in the growth.

In 1903 Dr. A. B. Cooke reported a very interesting and unusual case of molluscum fibrosum of the rectum occurring in a white man 43 years old. First rectal symptoms appeared at the age of 13 with protrusion following a costive stool. For several years he was compelled to replace the prolapse after every defecation and the pain was sometimes so great as to keep him in bed for several days. Blood and mucus were discharged from the rectum during severe attacks. Patient was always constipated until nine years ago, when diarrhea and incontinence suddenly supervened. Four years later the protru-

sion was removed with no improvement; recurring later it was treated by the injection method several times. Patient became bedridden, emaciated and was taking three-quarters of a grain of morphine daily. He came to Dr. Cooke with the diagnosis of cancer of the rectum. When first seen by Dr. Cooke he was having a dozen stools a day, the sphincters were relaxed and the skin of perianal region was excoriated from frequent discharges of blood and mucus. On examination the rectum was found completely filled with polypoid tumors, many of which were ulcerated and bathed with mucus, pus and blood of an exceedingly offensive odor. The tumors originated from the entire mucous surface of the rectum and varied in size from a bird shot to an almond. The larger were pedunculated, others being sessile. The smallest and fewer in number were located in the lower part of the sigmoid. The majority of these growths were removed by forceps and curette, which produced very free hemorrhage; so that it was possible to remove only a small number at a sitting. More than 60 distinct tumors were removed eventually, the patient making a good recovery. Many tumors were present upon the skin which were removed and proved microscopically to be of the same character of growth as the rectal fibromata. The rectal tumors examined were composed mainly of white fibrous tissue, the myxomatous tissue being much less abundant than in the tumors which were removed from the skin.

The Treatment of these neoplasms should be a complete removal of the growths. The method to be employed in any case should be determined by the location, thickness of pedicle, size of tumor, etc.

Lipomata occur in the rectum and along the entire large bowel, and similar tumors are said to be found occasionally in the small intestines. They may have very short pedicles or may have stems two or three inches in length. They are more or less lobulated tumors, containing fat cells and inclosed in a fibrous stroma. Lipomata remain in the bowel with less disturbance to the patient than any other neoplasm. Of course, if they are large enough to cause obstruction or if they protrude the symptoms under such circumstances will be similar to other growths. These tumors sometimes cause prolapse of the rectum or invagination when situated higher up. It seems that in most recorded cases the tumors appeared to descend from the pelvic colon or the upper portion of the rectum, which led some observers to conclude that they originate in the appendices epiploicæ. It is also observed that the pedicles of these tumors contain a funnel-shaped process of peritoneum.

The Treatment of lipomata is similar to that of pedunculated tumors previously described. Care should be exercised, particularly, to ob-

serve the possibilities of a portion of the peritoneum being present in the pedicle.

Myomata.—These are very rare growths of the anal and rectal region. When found in this locality they originate in the muscular coat of the bowel and may project external to the bowel or into its lumen. When sessile they appear as broad, nodular tumors with a movable mucous membrane, or, if pedunculated, they hang loose in the bowel.

The Size of these growths varies considerably. Berg reports a case where the tumor was sufficiently large to fill the hollow of the sacrum.

Very few *Symptoms* are present unless the growth is large enough to cause obstruction. If ulceration exists there will be pain with a discharge of pus, blood and mucus. Hemorrhage is an infrequent symptom on account of the poor blood-supply of the growth.

The Treatment consists in complete removal. Where this can be accomplished through the rectum good drainage should be secured. In case the tumor be accessible, it is best removed external to the bowel and the muscular wall closed by means of sutures.

Angiomata are tumors composed chiefly of vascular elements. Those composed of blood-vessels are known as hemangiomata and those of lymph-vascular origin as lymphangiomata.

Hemangiomata are occasionally found about the anus or rectum. They consist of dilated capillaries and veins held together by connective tissue, and possess no power of independent growth, simply being distended vascular spaces filled with blood. They are also known as nevi, and thought to be congenital. They appear as diffuse, reddish or purplish tumors slightly elevated and when the mucous membrane or skin is abraded or ulcerated they may produce considerable bleeding. Cases are on record where patients have died from loss of blood as a result of this condition. They may involve only a small area of the rectal mucosa or completely encircle the bowel.

Dr. Lewis Adler has reported a very interesting case of nevus of the anus which he stated was about two inches in width and elevated from the surrounding skin about one-sixteenth of an inch. The anus was quite patulous and upon straining hemorrhoidal masses protruded and the nevus around the anus visibly increased in size. The patient stated that he had been greatly annoyed by external fullness at the anal region since birth and at times it was markedly increased when walking or at stool. Dr. Adler states that when the patient was anesthetized for operation and the sphincters divulsed the nevus became very much enlarged, standing out almost an inch from the surrounding parts. After

the hemorrhoids were removed he made an elliptical incision around the nevus and removed the entire tumor in one strip.

The Treatment consists in the use of the Paquelin cautery, or, as has been suggested, the Whitehead operation may be employed when the growth involves the anal lining.

Enchondromata are among the rarest tumors of the anal and rectal region. They may develop in the skin or in the sacrococcygeal bones or cartilage. They appear as rounded, nodular masses of variable size, are of slow growth, and the effect upon the surrounding structures is mechanical. They are recognized by their dense and somewhat elastic structure. Histologically they consist of hyaline cartilage or fibrocartilage which has more or less the appearance of normal cartilage. Very few cases of enchondromata in the anal or rectal region are recorded, the most typical being those described by Van Buren and Dolbeau. Dolbeau reports a case where the growth was located at the entrance of the anus. It was the size of a hazel nut, hard and movable and caused no pain except when a syringe tip was introduced. Around the tumor the mucous membrane was eroded. The microscopic examination showed a predominance of the fibrocartilaginous element with glandular *culs-de-sac*.

The Treatment consists in complete removal.

A Dermoid Cyst is a cystic tumor containing dermal tissue, as hair, teeth, skin, etc. They are frequently seen in the sacrococcygeal region, but are rarely seen as tumors of the rectum. In the sacrococcygeal region they are possibly due to an infolding of the fetal clefts, carrying with them remnants of skin tissue, which lie dormant until exposed to irritation, when proliferation may take place and result in the formation of a tumor. They may originate from the post-anal gut, which is a fetal remain represented by the coccygeal body at the end of the coccyx. They usually appear as cystic tumors surrounded by a capsule which contains skin or its modifications, as teeth, hair, sebaceous glands, epithelium, etc. When infected or degenerated they contain a cheesy, pus-like material which may give rise to an abscess that opens externally and leaves a fistula. They vary in size from that of a pea to growths weighing three pounds or more. True dermoids of the rectum are very rare, the tumor in most instances probably originating in the mucous membrane of the bowel. The history given in some of these cases is quite unique; the patient complaining of a fullness and inability to completely empty the bowel, together with protrusion of hair from the anal canal.

The Symptoms of dermoid cysts external to the bowel, excluding inconvenience, are *nil* unless abscess formation takes place, when the symptoms will be those ordinarily met with in this condition. If an

abscess has developed and opened spontaneously the patient may first be seen without a fistulous condition. If in the rectum, the patient will complain of weight, fullness and desire to defecate. When ulcerated there will be pain with a discharge of pus, blood and mucus.

The Treatment of this condition consists in complete removal.

Syphilitic Gummata rarely occur in the anus and rectum. In the rectum they occur in the submucous tissues. They may vary in size from a small bean to a hen-egg. They are usually globular, smooth and elastic to the touch. They may be single or multiple and are more frequently seen in women than men. They do not exhibit inflammatory symptoms unless they break down and become infected. The degeneration is due to insufficient blood-supply for the maintenance of vitality in the diseased tissues.

Gummatous tumors do not result in abscess formation and are not painful, but do form ulcers when broken down, the repair of which may result in stricture formation. Of course, temporary strictures may be formed by gummatous infiltration and a deposit of fibrous material.

If there is any difficulty in determining whether or not the tertiary stage of syphilis is the causative agent in these lesions a Wassermann test should always be made.

The Treatment includes remedies that are employed in the tertiary stage of syphilis, including salvarsan. Of course, ulcers, fistulæ and strictures should be treated locally in conjunction with constitutional remedies.

CHAPTER XX.

Colotomy (Colostomy).

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FOR more than a century and a half the operation of colotomy has been performed the world over for the relief of intestinal obstruction, following malignant disease of the rectum and other causes. It must not in any way be considered as a rival operation to that of excision, for in a number of cases excision is quite impracticable, and it is in such cases that the question of colotomy arises. Many surgeons use the word *colostomy*, which has of recent years superseded the old term *colotomy*, but in this chapter we shall cling to the old term.

The history of inguinal colotomy begins with the suggestion of Littré, one hundred and ninety years ago, in the "Memoirs of the Academy of Sciences" of Paris. He merely discussed the advisability of opening the sigmoid flexure by an operation through the abdominal wall, as a means of relieving infants born with an imperforate anus. The idea slept for sixty years, when Pillore, of Rouen, performed the operation by opening the cecum on the right side.

Collisen, at the end of the eighteenth century, proposed opening the descending colon by the extraperitoneal method, but his failure to reach the colon on the dead subject by this means discouraged further trial.

Amussat, some sixty-five years ago, first established lumbar colotomy as one of the resources of practical surgery. For some years afterward colotomy was almost invariably performed in the lumbar region. About twenty-five years ago a revolution set in as regards this operation, and the inguinal method was adopted first in England, due to the writings of Herbert Allingham, Reeves and Cripps. With the advent of aseptic surgery, however, lumbar colotomy disappeared, and with it the operation of lumbar colotomy has almost been discarded from surgical practice. The statistics published twenty-five years ago give a death rate of 38 per cent. for lumbar colotomy, and of 46 per cent. for the inguinal operation; but since the advent of aseptic surgery, the death rate from inguinal colotomy is practically *nil*, except when undertaken for urgent obstruction.

The reasons for this change of attitude towards an operation which only a generation back held a prominent and apparently well established position are worthy of note. In the first place, the lumbar operation is by no means a simple one, the space in which the surgeon has to work is limited, and the gut lies at such a depth in fat subjects as often to render its exposure and subsequent fixation matters of extreme difficulty. Again, the existence of a distinct mesocolon, which is said to occur in 36 per cent. of all cases on the left side, and in 26 per cent. on the right side (Treves), may give considerable trouble and possibly lead to some error as to the portion of bowel to be dealt with, or may involve an opening of the peritoneal cavity for the purpose of identification.

The chief advantages of colotomy are as follows:—

First, it is an absolute security against death from obstruction, with all of its horrors; second, it affords relief to some of the most distressing symptoms; third, it retards to some extent the rate of growth of the disease. It has generally been looked upon as a *dernier ressort*, only to be had recourse to at as late a date as possible, and consequently it has been undertaken under the most unfavorable conditions.

In discussing this operation we must not confound the mortality from operation with that from the disease for which the operation is performed. Many persons in whom colotomy has been done have been *in extremis* at the time of operation, and have died from the disease, rather than from the operation. The patient's strength has been steadily undermined by the pain of the disease, as well as by the absorption of the toxic materials, both from the retained feces and from the ulcerating discharges of the surface of the growth, and it is not to be wondered at that the mortality was correspondingly high.

If left to itself, the termination of rectal cancer is very frequently from complete obstruction. From the time that the stricture first becomes noticeable it may be a matter of weeks, months or even a year or more. During this time the patient's mind is in a state of constant anxiety. He feels the constant danger and is hourly in fear of fatal obstruction. But with the knowledge that after colotomy he has an effective safety valve, mental relief comes quickly and fear vanishes. He often asks if the operation cannot be postponed until obstruction occurs. The answer to this lies in the fact that the operation, when done prior to the obstruction, is a comparatively safe one, while if done after complete obstruction has occurred, the risk increases enormously. Colotomy in these cases will prolong life indefinitely by relieving obstruction, if it exists, and by allowing the rectum to become quiescent by giving another outlet for the feces. Ulcerations which have resisted all local treatment may be healed by this means; and should they not

heal, will cease to exhaust the patient with pain, tenesmus, and loss of sleep. So much may be gained by colotomy in almost any case. At the same time the method is not curative, but only palliative, and complete removal of the diseased rectum by excision is always to be considered.

The pain caused by the growth or ulceration varies greatly and is more influenced by the position than any other factor. If low down near the anus, the pain is often intense, whereas when high up in the bowel, there is comparatively little discomfort. Sooner or later the bowel becomes constricted and causes the greatest misery. The sufferer is called to the closet constantly and believes he has a diarrhea, and not infrequently has been told that he has chronic dysentery. His passage is not a true motion, but a mucous discharge, stained with blood and fecal coloring matter. This discharge arises from an accumulation of scybalous masses in the dilated bowel above the stricture, and that which comes away is merely the overflow from this mass, mixed with blood and mucus. As time advances the trouble increases, the anus becomes raw and excoriated and the patient is constantly troubled with pruritus. Colotomy relieves all symptoms arising from a contracted bowel. The patient is no longer worried by the passing of mucus and blood, but instead has one or two good actions through the colotomy wound daily. A mass of decomposing feces is no longer collected above the stricture, and his freedom from toxemia from this cause is seen at once by an improvement in spirits, restoration of appetite and very often increase in weight.

I shall never forget my first case. The obstruction was caused by a large bony tumor on the anterior wall of the sacrum, which had previously, years ago, been chiseled off by the lamented Dr. W. W. Dawson, of Cincinnati, Ohio, but had returned. He was pronouncedly toxic, abdomen distended, and suffering intense pain. I made an inguinal colotomy and after six hours opened the gut. The bed was flooded with feces, but no damage was done to the wound; that is, no infection followed. He made rapid recovery and I kept in touch with him for ten years. He followed his vocation of gathering rags and iron from the streets. His colotomy gave him no trouble. He had his stools regularly every morning, and after cleaning himself, applied a pad of gauze over the wound, held it in place by an abdominal bandage, and went about his work. The second case postponed the day of operation too long and died on the following day from pronounced *toxemia* and shock from the disease rather than from the operative procedure. What a contrast!

That colotomy prolongs life by relieving pain, preventing obstruction, and to a certain degree retarding the growth of cancerous disease

to my mind is beyond question. That it substitutes in many cases a painless death for one of great agony is, I believe, indisputable. I believe that the progress of the growth becomes slower after the bowel has been opened and set at rest by colotomy. This view seems consistent with the well-known physiological law that disuse of a part is followed by a diminished blood-supply and atrophy. Matthews does not believe that changing the current of the feces has any influence over the growth of the disease. He believes that the increase of the growth is by an *inherent* power, deposition, infiltration, etc., more intrinsic than extrinsic. My personal observation of a limited number of cases leads me to believe that the constant irritation of the feces does influence the growth of the disease, and that colotomy does bring relief.

Kelsey is of the opinion that colotomy retards the growth and brings marked and immediate relief. He says, "delay may cost a patient his life, for the hour when a chronic obstruction will change into a fatal condition can never be foretold, and after acute obstruction has set in the dangers of colotomy are greatly increased. The operation should be advised as soon as the diagnosis is made, and the *impossibility* of complete removal, not only of the rectum, but all *involved* mesenteric glands, is admitted."

Gant says that his experience with colotomy has been entirely satisfactory. His colotomy patients, who have come from various walks of life, have "in but very *rare instances* complained of the almost constant dribbling of feces through the artificial anus, which has been so vividly described by opponents of the operation." While he is a firm believer in both *temporary* and *permanent* colotomy, he wishes it to be plainly understood that he never resorts to either operation "*until all other palliatives and minor surgical procedures for the relief of the case under treatment have been unsuccessfully tried.*" This, the author believes, is a fair and unprejudiced stand taken by Dr. Gant, and fully concurs in it.

The prejudice against both temporary and permanent colotomy is due largely to the ignorance of both physicians and the laity as regards the improved technique and the merits of the operation, and its increased field of usefulness. By the improved technique the mortality is not more than two per cent. in the hands of competent surgeons. By the improved technique the patient has greater control over the bowel movements. As a result of these improvements, together with the fact that an artificial anus can be closed as soon as the disease is cured, with comparative safety, more patients suffering with intestinal diseases will doubtless be given the benefits of the operation.

The indications for colotomy are as follows:—

Congenital malformations in which the gut ends in a blind pouch; strictures which are undilatable and inoperable; inoperable fistula in which the feces find their way into the bladder and urethra; incurable tubercular and syphilitic ulceration; obstruction of the bowel caused by foreign bodies which cannot be dislodged and removed; obstruction due to inflammatory adhesions and exudations, involving any part of the colon or rectum. Although an artificial anus may be necessary to cure the above conditions, colotomy should not be practised as a routine procedure, except in selected cases in which the symptoms of obstruction, pain, hemorrhage, diarrhea or discharge are so great that the life of the patient is despaired of, or when it is necessary to give the diseased bowel rest from the constant irritation incident to contamination by the feces and the constant tenesmus.

There are two distinct classes of cases in which colotomy is applicable: first, those in which it is possible to restore the normal fecal canal; second, those cases in which the disease is incurable, or in which, the diseased portion being removed, it is impossible to restore the normal fecal canal. In the first class of cases, when an artificial anus is determined upon, it is important that it should be so made that when the disease is cured, it can be closed with as little inconvenience and danger as possible to the patient. In the second class it should be made so as to give as great control over the feces as possible and so that it can be attended to with comparative ease and comfort to the patient.

In the early history of this operation, when it was only performed for incurable conditions, the chief effort of the surgeon was to produce an artificial anus which would afford an efficient exit for the fecal material, and prevent its escape into the lower or diseased segment of the gut. During this period the efforts were directed toward the formation of an acute elevated spur between the two legs of the gut in which the anus was made, and to prevent prolapse of the bowel. This was the end in view entertained by some surgeons; while another class aimed in their work to obtain an artificial anus that would give the greatest amount of continence in the most convenient position for the patient.

The discussion of this subject naturally divides itself into temporary and permanent methods.

TEMPORARY COLOTOMY.

The temporary artificial anus consists of an opening made in the intestine at some point above the disease for the purpose of turning aside the fecal current while the local treatment is being carried out

or some operation is being done below. The site of the opening depends upon the location of the disease and the treatment to be adopted. If local treatment is to be employed, the site of the opening should be as close to the disease as is consistent. If operative procedures are to follow, then it should be placed sufficiently far from the disease to allow the surgeon the greatest freedom in dealing with healthy tissue between it and the diseased portion to be removed, and the artificial anus should be so placed that it will not interfere with the re-establishment of the normal fecal current, if such be possible. In some it is necessary to use the lower portion of the sigmoid, in some the upper portion of the sigmoid, and in others the transverse or ascending colon. The essential features of an artificial anus are to give free exit for fecal material, to prevent its escape into the gut below, and to facilitate its closure after its purposes have been carried out. Therefore, we should be ever mindful of the fact that it should be so made that it may be closed without danger to the patient, if possible.

There are several different techniques employed in the performance of this operation. Some are designed especially with the end in view of forming an effectual spur, others to prevent prolapse of the gut, others still with a view of ultimate closure. The preparation of the patient is practically the same for all. The patient should be prepared as for laparotomy. The pubes should be shaved and the abdomen scrubbed with soap and water, then washed clean with bichloride solution and dressed with a bichloride pack the night before the operation. The bowels should be moved by a laxative the previous day and an enema the day of operation, except in emergency cases, when we must be content with the best immediate aseptic preparation possible. After the patient is anesthetized, the abdomen should be scrubbed again with bichloride 1:2000, and then washed with alcohol and finally painted with iodine. The abdomen having been thus prepared, it should be covered with sterilized towels, or sheet, except at the site of the operative field. An incision two or three inches in length should be made through the skin in a line with the fibers of the external oblique muscle one inch above and one and a half inches inside of the superior iliac spine, and should be carried through the skin and superficial fascia to the fibers of the external oblique muscle. The fibers of this muscle should be separated by dull dissection, layer by layer, drawing them apart by retractors. In this way their function is preserved. The external oblique is separated in one line, the internal oblique in another, and the transversalis fascia then comes into view. This fascia is then divided in a line with Poupart's ligament to the extent of about two inches. This brings

into view the peritoneum, which should be incised in the same line, and caught with artery forceps and drawn up into the wound in order to prevent its being stripped from the abdominal wound during examination. The patient should now be placed in the Trendelenburg position so that the small intestines will fall back out of the pelvis. The incision should now be made large enough to allow the introduction of the hand for exploration. After the exploration has been made, with the hand well down in the pelvis, the rectum may be traced upward, and without difficulty the lower loop of the sigmoid flexure secured and drawn out of the wound, taking care to determine which is the superior and which is the inferior segment. Both the sigmoid and colon are recognized by the longitudinal bands and by the attachment of the appendices epiploicæ. The sigmoid having been found and drawn up into the wound, and having determined which portion is to be fixed in the abdominal wound, the operation may proceed. Some surgeons suture the parietal peritoneum to the edges of the skin wound; others stitch the intestine to the freshly cut surfaces. Réclus, however, has shown this to be a useless waste of time, that it does not hasten union in the least, and produces a weaker adhesion of gut to the abdominal wound.

CRIPPS'S METHOD.

The colon being found, a loop of it is drawn into the wound. Draw out as much loose bowel as will readily come until the upper segment is taut, and the lower segment is pushed back into the abdomen. Two provisional sutures are passed through the longitudinal muscular band opposite the mesenteric attachment. These sutures, the ends of which are left long, help to steady the bowel during the subsequent stitching to the abdominal wall and should be about two inches apart. The loop is now dropped back into the abdomen, while the parietal peritoneum is sutured to the skin. It is then drawn up again, and while an assistant holds the long ligatures taut, it is fixed in position by seven or eight fine silk sutures, which pass through its peritoneal and muscular walls, and then through the edges of the peritoneum and skin. The sutures at the angles of the wound pass first through the skin and peritoneum, then through the peritoneal and muscular layers of the gut, and out through the peritoneum and skin on the opposite side, care being taken to avoid puncturing the mucous membrane of the bowel. The sutures in the gut are introduced in the longitudinal band on one side and along the border of the mesentery on the other, and by so doing about two-thirds of the

circumference of the gut is thus secured outside of the wound. In passing the upper row of sutures through the border of the mesentery, care should be taken not to pass the sutures through the blood-vessels, as they are of fairly good size. The wound should now be washed clean and the sutures tied with moderate tightness. Unless the case is urgent, the gut is not opened for several hours, or even two days. The wound is dressed by being smeared with sterilized vaselin and covered with oiled silk or rubber protective tissue, over which is placed a thick mass of gauze or cotton held in place by adhesive straps, and an abdominal bandage snugly pinned. The vaselin and protective rubber tissue prevent the bowel from adhering to the dressings, so that they can be easily removed when it is thought necessary to open the gut. When the gut is to be opened, a longitudinal incision is made between the two long ligatures which have been left in position. The edges are trimmed away above the level of the skin.

ALLINGHAM'S METHOD.

After the abdomen is opened a loop of sigmoid is drawn up and a silk suture is passed through the skin and parietal peritoneum on the one side, then through the mesentery, avoiding any large blood-vessels, and then through the parietal peritoneum and skin on the other, and tied. The parietal peritoneum is then stitched to the skin all around the wound, so that when the gut is opened later the intestine looks like the orifices of a double barreled shotgun. The mesentery is thus held in apposition with the parietal peritoneum, and all of the sigmoid which can be drawn through the abdominal wound is held outside of the abdomen. The edges of the wound are then sutured to the gut, the number of stitches varying according to the distention of the gut. The gut is not opened for some hours, and may be left for two or three days if the symptoms are not urgent. It is then incised longitudinally, and after the bowels have been once moved thoroughly through this wound, the loop is trimmed off with scissors, or clamped off, the clamps being tightened daily.

The objections to this operation are, first, the pain associated with the removal of the loop; second, it seems unnecessary to remove so much of the loop, as it interferes with closing the gut in temporary colotomy, and it necessitates intestinal resection to close it.

KELSEY'S METHOD.

The abdomen being open, bring a loop of the sigmoid up through the abdominal wound and secure it by passing a silver wire threaded

with a metal shield held on by a perforated shot, through the entire abdominal wound about one inch to the right of the abdominal incision; then through the mesentery and back through the abdominal wound on the opposite side from within outward. The wire is drawn taut, thus bringing the edges of the wound in close apposition with the mesentery, and the free end threaded with a shield and shot as on the opposite side. He does not suture the peritoneum to the skin, but brings them together with interrupted silk sutures, each passed through the skin, then through the parietal peritoneum, and then through the peritoneal and muscular coats of the intestine. In this way the wire suture passes under the gut and causes it to bend sharply, and at the same time the sides of the incision are drawn together and firmly held. Next suture the gut to the cut edges of the peritoneum, and both to the margins of the skin incision. Fine black thread is used for this purpose, and the stitch is passed first through the margin of the skin, next through the corresponding margin of the parietal peritoneum, and finally through the parietal and muscular wall of the gut. The needle does not pass through the cavity of the gut, nor is the muscular layer of the abdomen included in the stitch. When tied the peritoneum of the gut will come in contact with the parietal peritoneum, and both with the skin margin, and the general peritoneal cavity will be closed at this point. It requires about eight stitches, one at each end and three on each side. Whenever possible the stitch should include the longitudinal band of the gut, which is the strongest part, and which can always be plainly seen. In this way the knuckle of intestine is drawn well out of the wound, firmly secured with the peritoneum against peritoneum, the general peritoneal cavity closed, and the strain is taken off of the fine silk sutures by the wire or silkworm-gut suture. The gut is now opened with scissors at the upper angle of the wound; the finger is passed into this for a guide and the projecting part of the gut is trimmed away down to within a quarter of an inch of the margin of the skin. The bowel, when opened, has the appearance of a double barreled gun, with the lower orifice smaller than the upper. The suture under the bowel may be removed at the end of the fourth day, and the others as the surgeon sees fit. The wound is dressed with gauze previously covered with vaselin and held in place by an abdominal bandage. It is always well to cover the wound with rubber tissue to prevent the gauze adhering to the intestine.

This technique of Kelsey's is the one I have always used in my work and it has always given me entire satisfaction.

TUTTLE'S METHOD.

An incision through the skin and superficial fascia is made in a line with the fibers of the external oblique muscle, beginning at a point one inch above and one and one-half inches inside of the anterior superior spine of the ilium. It should be at least three inches in length. The fibers of the external and internal oblique are separated with a dull instrument, and drawn apart with broad retractors. The fascia transversalis is then divided by an incision in the line of Poupart's ligament. At this point all bleeding vessels are ligatured and the wound thoroughly dried with sterilized gauze. The peritoneum is then opened by a small opening, the finger being introduced through this as a guide, and the membrane incised the whole length of the wound in the transversalis fascia; its edges are caught with hemostatic forceps and drawn up into the wound. The hand of the operator is then introduced and a thorough exploration of the abdominal and pelvic cavities is made. After this has been done, if it is found advisable to proceed with the temporary artificial anus, the sigmoid is caught, dragged out of the wound, and the proper point to be utilized is determined upon. A small incision is then made through the mesentery, care being taken to avoid the blood-vessels, and a glass rod about one-fourth of an inch in diameter and four inches in length is passed through this, its ends resting upon either side of the wound. The lower angle of the wound is then closed by silkworm gut sutures passed through all of its coat to such an extent that it compresses the inferior leg of the intestinal loop against the glass rod. Fine chromicized catgut sutures are then passed at the two angles of the wound through the skin and peritoneum; then through the peritoneum and skin upon the opposite side. Small pads of iodoform gauze are introduced under the protruding ends of the glass rod along the edges of the wound close to the intestine, after the latter has been smeared with sterilized vaselin. The whole is dressed with protective tissue, covered by a thick pad of gauze or cotton which is held in place by adhesive straps, and a firm abdominal bandage applied. The gut is never opened at this time. If there is great distention by gas, a trocar is inserted to allow its escape. After this has taken place, the opening made by the trocar is closed by two Lembert sutures and sealed with iodoform collodion. The patient is placed in bed with his hips well elevated, and is given sufficient morphine hypodermically to control vomiting and intestinal peristalsis for the succeeding ten or twelve hours. The gut may be opened with perfect safety at any time after the first six hours, although it is better to wait two or three days in cases which

will admit of such delay. This opening should be made by an incision through the longitudinal muscular band opposite the mesentery, extending from the superior angle of the wound to one-half inch below the supporting rod. A transverse incision is then made at the lower end of this wound involving two-thirds of the circumference of the gut. By this means the triangular flaps in the upper segment roll backward and curl up like dried leaves. The straight flap in the lower segments falls downward and inward, practically closing the lower aperture. The fecal discharges are thus carried outside of the abdominal cavity, and there is scarcely any possibility of their escaping into the lower segment. In addition to this, no portion of the intestinal wall is sacrificed, and when it becomes advisable the artificial anus can be closed by simply suturing the edges of the T-shaped wound without opening the peritoneal cavity. If the disease is to be treated by resection of a portion of the gut below, the artificial anus is made high up in the sigmoid in order that as much as possible of this organ may be left below to be utilized in the re-establishment of the natural intestinal canal. The longer the loop is thus left below the artificial anus, the easier will be the subsequent operation of extirpation or resection. The glass rod is retained in position for two weeks or even longer. It occasions the patient no inconvenience, and it is prevented from slipping out of place by a narrow strip of adhesive plaster around each end and fastened to the abdominal wall above the wound. To convert this temporary artificial anus into a permanent one cut through the posterior wall of the gut, which is supported by the rod, and trim off the protruding edges to within two-fifths of an inch of the skin. The opening of the intestine requires no anesthesia, and if there is any bleeding, it should be controlled by twisting or ligating the arteries.

Tuttle's technique for closing this temporary colotomy is as follows:—

The triangular flaps in the upper segment which curl up and become adherent in their peritoneal layers are unrolled by carefully breaking up these adhesions with the fingers or dull instruments. The edges are then freshened, together with that of the lower transverse flap. The T-shaped wound in the gut is brought together by silk sutures passed through the mucous membrane, after the manner of Czerny, and a row of Lembert sutures outside of these made. After this has been accomplished, the gut is dissected from its attachments to the abdominal wall down to the peritoneal layer. This layer is carefully stripped from the abdominal wound for about an inch all around the artificial anus. This loosening provides a loop of peritoneum which allows the closed gut to drop down below the level of

the abdominal wall. The opening in the latter, already freshened by dissecting loose the intestine, is then brought together by silkworm-gut sutures passed through all its layers.

PERMANENT COLOTOMY.

The first real advance toward the establishment of the modern inguinal anus was that of Wetzel,¹ who instead of bringing the loop of intestine out through the first abdominal wound, made a canal for it by separating the external and internal oblique muscles over the brim of the pelvis and suturing it to the opening in the skin one inch below it. Bailey modified this by bringing the intestine down between the skin and the external oblique muscle, and bringing it out through an opening in the skin just above Poupart's ligament two inches below the abdominal incision. Tuttle modified this by the ordinary incision for inguinal colotomy. He then separated the fibers of the external and internal oblique muscles by blunt dissection. The transversalis fascia and peritoneum are incised in a line parallel to Poupart's ligament. A loop of sigmoid sufficiently long to be drawn at least two inches outside of the abdominal cavity is selected and a tape or loop of large silk is passed around it through a slit in the mesentery and the ends left long and held by an artery forceps. The lower fibers of the external oblique are then pulled downward and the internal oblique split laterally to the distance of three-fourths inch. A canal is then made between the skin and the external oblique downward to the extent of about two inches, opening through an incision in the skin just above Poupart's ligament. The canal should be large enough to permit the loop of sigmoid to be drawn through it without much compression. With the aid of dressing forceps the loop of gut is then dragged through the lateral slit in the internal oblique and down through the canal outside of the external oblique muscle until it emerges at the inferior opening in the skin. It is held in this position by a glass rod through the mesentery, or by suturing it to the edges of the skin wound. The abdominal wound is closed by chromicized catgut sutures in the muscular layers and a subcutaneous silk suture in the skin. It is then closed by iodoform collodion and dressed with sterilized gauze, over which a layer of protective tissue is placed and sealed to the skin with collodion. This is done to avoid infection of the primary wound through the escape of feces when the gut is opened. The loop of intestine may be opened immediately, but it is better to wait twenty-four to forty-eight hours before doing so. This is accomplished by making a simple slit in the line of the longitudinal fibers of the gut. After ten days the pro-

¹ Centralblat. für Chir., 1894, No. 10.

truding portions of the gut may be trimmed down flush with the skin, and the artificial anus will present itself as a double barreled aperture, one opening of which connects with the proximal, and the other with the distal, end of the sigmoid. The gut rests upon the external oblique muscle as a resisting plane, and being passed through the slit in the internal oblique, the fibers of which exert a voluntary control, the patient usually possesses almost complete continence. When necessary an ordinary single spring hernia truss, with an elongated pad placed over the opening, serves every purpose.

Numerous mechanical appliances have been devised in the form of bags to catch the escaping feces, and plugs and pads to obstruct the fecal exit. Thus far a pad made of absorbent cotton covered with two or three thicknesses of gauze and held in place by an abdominal bandage, and which is very simple, has served the author well and met every requirement. The double inflatable bulb of Weir, which is a modification of Jacobson's intestinal plug, is spoken of highly by Tuttle. Brick's receptacle for artificial anus, which consists of an aluminum ring and pure gum bag, has met with favor among some Philadelphia surgeons.

While these various mechanical devices control the feces and are satisfactory for a time, they will, I believe, produce a local irritation and annoy the patient so much that he will be obliged in time to lay them aside and return to the simple gauze pad.

CHAPTER XXI.

Extirpation (Excision) of the Rectum.

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HISTORY.

THE name Lisfranc stands prominently among the earlier advocates for the treatment of rectal cancer by extirpation (1826). The operation had previously been performed by Faget in 1739. Prior to that it had been suggested by Morgagni, but history does not record the fact as to whether he ever performed the operation. The early results did not, however, create enthusiasm on account, no doubt, of the high mortality due to the lack of general anesthesia and aseptic surgery. Until about 1880 the operation was evidently confined to growths low down, and the perineal method was the only one employed. Later Verneuil, acting on the suggestion of Amussat, first practised the removal of the coccyx in extirpation of the rectum; but this was not popular, and it was left for Kraske in his paper before the Fourteenth Congress of German Surgeons in Berlin, in 1885, to give an impetus to the operation of extirpation by suggesting the excision both of the coccyx and a part of the sacrum, in order to remove growths involving the upper portion of the rectum. Soon after this announcement other surgeons, notably Hochenegg and Bardenheuer, suggested the removal of larger portions of the sacrum, in order to widen the operative field.

Rose later on suggested a technique which practically sacrificed the entire bony floor of the pelvis. This was certainly extremely bold surgery, and by way of modification, Billroth proposed to make bone flaps containing both the coccyx and the lower segments of the sacrum, which were to be sutured back in position after the rectum had been removed. Price made use of the vagina as a point for the implantation of the gut after extirpation of the rectum, where it was impossible to bring it down and suture it to the margin of the anus, but did not suggest attacking the growth through this organ (Tuttle). Maunsell advised laparotomy, in 1892, in order to loosen the upper rectum and sigmoid from its sacral attachments. Shortly afterward the abdominal route alone was suggested by Mann and Edebohls.

Thus, as we follow the history of this operation, we see that each surgeon, stimulated by a desire for something better, was simply adding his mite to the improvement of the technique in order to relieve suffering humanity. In this country Roberts, Bridden, Kelsey and Tuttle have done much in improving the technique of this operation.

Among foreign surgeons we owe much to such men as Sir Alfred Cooper, Mr. Swinford Edwards, Charles B. Ball, Harrison Cripps, William Allingham and others, who did much toward the establishment of this operation on a sound footing.

With reference to this operation, as to many others, the pioneers have been much abused; but this criticism had its value, for it was the means of stimulating thoughtful and enterprising surgeons to renewed activity in seeking to improve the methods of operation. Ultimately the operation became recognized as the most valuable method of treatment in suitable cases.

In discussing the treatment of excision, the following are the chief points requiring consideration: 1. Diagnosis. 2. Selection of cases for operation. 3. Prognosis after operation, immediate and remote. 4. Preparation of patient. 5. Methods of operation.

DIAGNOSIS.

To regard excision of the rectum as the ordinary treatment for all cases of rectal cancer is but to throw discredit upon the method. The mortality following Billroth's operation should stand as a warning against its indiscriminate performance. The same rule that would guide a careful surgeon in undertaking any severe operation must hold good in cases of rectal cancer. The age of the patient, his general health and strength, and the condition of his urine and cardiovascular system must be taken into consideration, for an operation which in a middle-aged and comparatively healthy patient is one of small risk, becomes extremely hazardous in the aged and feeble.

The abdomen must be examined to ascertain whether the abdominal viscera and lumbar glands are implicated. If the general condition is good, the local condition should next be inquired into.

In dealing with cancer a reasonable prospect of its being entirely removed without serious damage to the neighboring organs must first be determined. Ordinarily the finger can explore to a distance of from four to five inches. If the patient is instructed to strain down and pressure on the abdomen downward is made, a slightly higher portion of bowel can be reached. If at this examination, the finger fairly passes beyond the growth in an upward direction, the case may be considered favorable for operation.

The next point to be ascertained will be whether or not the neighboring organs are implicated. It is of the greatest importance to determine with some degree of precision the extent to which the urethra, prostate, bladder in the male, and vagina in the female are implicated. In the male although the disease may be in the bowel in close proximity to the prostate, it is a long while before the prostate itself becomes involved; in women, on the contrary, when the disease is situated on the anterior aspect of the bowel, the vagina quickly becomes implicated. So long as the mucous membrane of the vagina remains free, it is possible to dissect the anterior wall of the rectum from the vagina without making an opening into the latter. If the growth is adherent to the upper portion of the vagina in the immediate vicinity of the uterus, the peritoneal membrane of Douglas's pouch is pretty sure to extend down to it, and the growth cannot be removed without opening the peritoneum. Under these circumstances, it is better, save in exceptional cases, that no operation be undertaken, not so much on account of the necessary opening of the peritoneal cavity, as because the disease, having once implicated this membrane, is fairly certain to have spread in the course of the lymph paths beyond the reach of complete removal, unless the combined operation is to be done.

Yet in one of my cases the anterior vaginal wall was involved and the patient still lives and is in the best of health, while in a second similar case the patient lived five years with no return in the rectum, and was in the best of health; but shortly afterward the vagina, uterus, and bladder became involved, pneumonia followed and she died within a few days.

If the disease is confined to the posterior wall, the case is in every respect more favorable for the operation than when situated in front. In this position there are no anatomical difficulties to prevent the thorough removal of the disease to the extent of four to five inches. As a rule glandular infiltration comes on later and even extensive, hard, nodular masses lying behind can be easily removed. Each case is a law unto itself and will have to be decided on its own merits, after due consideration has been given to the surrounding circumstances. The distance just mentioned must only be considered as approximate. Should there be any doubt, a second examination under an anesthetic should be made before deciding absolutely against an operation. In too many instances, unfortunately, the patients come for the first time under the notice of the surgeon when it is too late to operate. The delay in diagnosing rectal cancer, and of realizing the necessity of an early operation, cannot always be placed to the charge of the patient, however, as it is often the result of the surgeon's omission to practice careful digital and recto-

scopic and sigmoidoscopic examination in every case of even apparently mild affections of the lower bowel.

Consideration of the reasons which render the radical treatment justifiable, and of the necessity of an early operation, should, the author holds, be based on correct ideas of the anatomical extent of the rectum, and especially of its superior limit. The latter is situated at the level of the third sacral vertebra and corresponds to the posterior reflection of the *cul-de-sac* of Douglas, and to the lowest point of the mesosigmoid. Tumors situated exclusively within the peritoneal cavity cannot be regarded as rectal growths.

In making our diagnosis as to whether extirpation is justifiable in a given case, let us remember that we may be dealing with a benign ulceration. Some years ago I met with a case presenting an ulcerated condition of the middle chamber of the rectum on the proximal side of the middle rectal valve. The patient's condition was most miserable. I did a complete proctotomy, and he finally made a complete recovery. In a second case I was content at first to repeat the operation of proctotomy, believing I had a purely benign ulceration to deal with. I removed a portion of the ulceration by curettement and also a polypus, which was pronounced by the pathologist to be benign; but there was a prompt return of the disease, and then extirpation was done with recurrence in three and one-half years, but death soon followed.

It is this hypertrophic ulceration in the middle and upper rectal chambers, associated often with polypoidal masses of varying sizes, many of them ulcerated, which can easily be improved and often apparently cured by curettement. But often there is a recurrence. Why? Because we have only removed the mucosa and submucosa. Extirpation should always be done when malignancy is diagnosed, for we must recognize that carcinoma involves the musculature of the gut.

The sigmoidoscope is the best help in the diagnosis of cases of obscure hemorrhage from, or too frequent action of, the bowels, with increased mucous secretion, when nothing can be felt per rectum by the finger. Unfortunately it only too often happens that medical treatment is employed ineffectually for some months before sigmoidoscopic examination is suggested, and thus the invaluable opportunity of detecting an early carcinoma of the rectum or colon is allowed to slip away.

The importance of prompt digital examination of the rectum cannot be too strongly insisted upon. My experience is that well over 25 per cent. of the cases of rectal cancer that come for examination are inoperable. This lamentable state of affairs is due partly to the insidiousness of the disease and the absence of symptoms in the early stages; partly to lack of observation on the patient's part and his failure to

seek advice; but also in part to mistaken diagnosis, because no digital examination had been made.

SELECTION OF CASES.

It is of no avail to show that anatomy will allow, and that theoretically there may be carried out, a surgical operation unless it can be proven beyond a doubt that in a majority of cases it is followed by beneficial results. There are few operations on the human body which may not be abused by the ignorant or too enthusiastic, although in the hands of a discreet surgeon they may be of the utmost value. It requires much care to select cases of malignant or specific rectal disease in which benefit is likely to result from extirpation. Unfortunately suitable cases are in the minority, for the symptoms are often overlooked or neglected until the disease has assumed hopeless proportions; or it may be that even from the first it was situated too high or too close to other organs to admit of operative interference.

The late Dr. Van Buren some years ago tried to lay down rules which should guide us in selecting cases for excision or extirpation. He taught that the growth must be distinctly circumscribed, movable on the subjacent tissues, and within easy reach by incision through the perineum. Since his time Kraske has given us an entirely new operation, performed by excising the coccyx and part of the sacrum, and the so-called high or abdominal method has been added to that. It has, therefore, become possible either to resect pieces of the rectum or to amputate long portions of the rectum, which would have been inoperable, according to Van Buren's rules, on account of their distance from the perineum.

This advance must not be overestimated. True, we can now amputate six inches instead of three, or we can resect a circular carcinoma at a point six inches or more from the anus. But to do any permanent good we must still confine our operations, as Van Buren insisted, to cancer of the gut, not of the gut, lymphatics and surrounding tissues, and operate at an early stage of the disease, if at all.

To reach safe conclusions on this subject it is necessary to be very accurate. Many cases should certainly not be submitted to extirpation, and there are some in which just as certainly colotomy should not be undertaken, at least not until excision has been tried. The former are those of extensive disease, involving not only the rectum, but the adjacent tissues and lymphatics, and in this class I personally would include many upon which others would operate. For my own part, I have ceased trying to dissect a cancerous rectum from the base of the bladder where it would almost require a microscope to decide whether all of the disease had been removed or not. In such cases I expect an immediate recur-

rence, and often before the incision has entirely healed. I have also ceased removing the deep urethra, prostate, and seminal vesicles to make sure without the microscope that all of the cancer is removed, for in these cases either death from the operation or immediate recurrence is to be expected. The cases in which extirpation may be done with a hope of cure are those of epithelioma low down, and more especially those which begin at the anus and secondarily involve the rectum. These are the cases which are curable by excision, or if not curable, those in which recurrence is longest delayed.

Besides these there is a class of cases in which the rule for treatment is still to be worked out. These are the cases of annular scirrhus of the rectal pouch, or even of the upper rectum, which are manifestly removable without extraordinary risk. In these we must determine which operation will give the greater length of life, extirpation or colotomy. In extirpation we do a capital surgical operation, for the hope of a cure in part, and, failing this, for the certainty of a palliation of suffering and probable prolongation of life.

All surgeons and pathologists of the present day agree in the declaration that cancers are primarily of purely local origin, and practically all unite in the statement that early recognition and thorough extirpation will cure a large proportion of all cases. Early diagnosis and immediate removal, then, mean life; late diagnosis and procrastination mean death. As we learn to recognize the character of malignant growths very early in their history, and as we teach our patients to submit to the removal of every suspicious tumor, our percentage of cures of cancers of the rectum will surely rise. Since the days of Lister the outlook in operative interference has grown brighter, until today we can offer positive assurance of relief from suffering and hope of a cure in many cases.

A growth that is limited to the rectum at whatever part it may be situated, and however high it may extend along the course of the bowel, may be removed by one of the various methods of operation to be described later. Extension beyond the rectum to surrounding parts, as shown by fixation of the growth to the sacrum on the one hand or to the bladder, prostate, vagina or uterus on the other, constitutes a contraindication to any attempt at a radical operation as a rule. But the degree of adhesion may be most difficult to estimate, and in doubtful cases the patient may himself choose to undergo an operation which may perhaps be attended by unusual risk so long as there remains a fair chance of obtaining relief of symptoms and prolongation of life, although the chances of a permanent cure may seem to be poor.

In doubtful cases an examination of the rectum under an anesthetic is always necessary, as some cases which otherwise might appear to be quite fixed (and therefore inoperable) will be found to be much less so when the tissues are relaxed and the growth can be freely manipulated, and the true amount of mobility determined. In many doubtful cases also, especially in high growths, much is to be gained by an abdominal incision with the patient in the Trendelenburg position. The state of the pelvis and the upper limits of the growth can be definitely ascertained, also the condition of the lumbar glands, and above all the presence or absence of metastasis of the liver. This is the strongest argument in favor of the abdominoperineal operation, and it should be adopted in very extensive and longstanding rectal growths where the possibilities of excision are doubtful. Conditions forbidding the radical operation may thus be discovered, and if necessary, iliac colostomy may then at once be proceeded with.

A growth the base of which is firmly adherent to the sacrum should not be removed, but partial or very limited adhesion need not contraindicate operation. Growths on the anterior wall which have become adherent to the prostate ought to be let alone. This is the most unfavorable position for a growth, and quite small ones may for this reason prove impossible to remove completely. A growth above the prostate on the anterior wall is more favorable. Here the question concerns the implication of the rectovesical pouch of peritoneum. As Cripps has pointed out, direct involvement of the peritoneum in the cancerous growth is a very serious complication, as it indicates such an implication of the lymph-paths that recurrence of the disease cannot long be delayed.

Thus far in the selection of our cases for extirpation we have confined our attention to carcinoma. But how about cases of papilloma and adenoma of the rectum? The author believes that these cases, so far as the mucosa and submucosa are concerned, are purely local and benign, but if we examine the musculature of the gut, we will find in a large percentage of the cases that the gut wall in the neighborhood and at the site of the adenoma and papilloma has undergone malignant changes, and that they should be given the same consideration as a malignant growth and treated accordingly.

But when we come to consider the selection of cases of syphilitic stricture for operative interference, it is quite a different proposition. Mathews says that he is very partial to internal proctotomy in these tubular fibrous strictures of the rectum, recognizing at the same time that he differs from many distinguished authors. He says that in all cases of non-malignant stricture, syphilitic or simple, either the inter-

nal linear proctotomy of the French, or the external operation as practised by many, is far preferable, in his judgment, to either excision or colotomy. Tuttle is of the opinion that internal proctotomy is a most dangerous procedure and imperfect treatment. Cooke, of Nashville, Tenn., is partial to linear proctotomy in these cases of fibrous tubular syphilitic strictures, because of the danger to life, either immediate or remote, in extirpating these cases, and says that were he the victim of such a stricture he would select proctotomy as the method of procedure. Now I do not believe for a moment, nor do I believe that either Dr. Mathews or Dr. Cooke believes that internal or external proctotomy will cure a fibrous stricture, but in doing a proctotomy we do a comparatively safe operation, notwithstanding Dr. Tuttle's contrary opinion, and relieve our patient and make him comparatively comfortable. In the writer's judgment, after due consideration and study of 30 cases of stricture of the rectum, most if not all being syphilitic, extirpation of such strictures would be most hazardous to the life of the patient. I can dissect a cancerous growth from the anterior wall of the rectum with comparative ease; but to dissect and remove all of the diseased fibrous structures of a syphilitic stricture from the prostate and bladder in the male, and vagina in the female, without serious damage to these organs is quite a different and much more difficult proposition. I believe that extirpation is the only avenue to a cure in these cases. If we select this method, the technique as laid down for operation by the perineal route should be followed.

PROGNOSIS AFTER OPERATION, IMMEDIATE AND REMOTE.

It is extremely difficult to estimate with exactness the relative mortality following extirpation or resection of the rectum for malignant or specific disease. When statistics, however, are drawn from authors who honestly compile them, and who publish the whole of their experiences, this difficulty is in a great measure obviated, and data sufficiently reliable for comparison may be obtained. A substantial death rate is inevitable in an operation of such magnitude as excision of the rectum, undertaken in patients no longer young, often weak and wasted, and in a part which cannot be kept absolutely aseptic and which, therefore, invites shock, hemorrhage, cellulitis and peritonitis.

Tuttle found the mortality to be 20 per cent. in a collection of 1578 excisions performed by various methods.¹

¹ Tuttle's Diseases of Anus, Rectum and Pelvic Colon, 1902.

Method	No. cases	Deaths	Mortality
Sacral	913	211	23.1 per cent.
Perineal	569	76	13.5 "
Abdominal	49	18	36.7 "
Combined	22	9	40.9 "
Vaginal	23	3	14.3 "
Anal	2	2	100.0 "
	1578	319	av. 20+ "

Lewis H. Adler, Jr.,² says:—

"My personal experience with cases of malignant disease of the rectum up to the present time numbers 217 cases. Excised 2, curetted the growth in 7, and colostomized 27, and 25 per cent. declined operation. Relative to the 3 cases of excision, one patient died within the year following the operation from cancer of the liver, another died five years after the excision, at the age of 77, no return of the disease, death being due to senility; the third is still alive and active, though past 70 years of age."

Collier Martin, of Philadelphia, reports 4 cases by the perineal method, with a mortality of 25 per cent. One died in one year after operation, from recurrence; 1 died ten months after the operation, and 1 in two and one-half years.

Beach, of Pittsburgh, reports 2 cases operated by the sacral method, with 1 death; 31 by the perineal method, with no deaths; 1 by the vaginal method, with no deaths; 14 colotomized, with no deaths, and 2 by the combined method with 1 death.

Hirschman, of Detroit, makes the following report:—

Method	No. cases	Deaths	Mortality
Sacral	1	0	0
Perineal	27	2	8 per cent.
Abdominal	4	1	25 "
Combined	8	2	25 "
Vaginal	2	0	0
Anal	9	1	11 "
	51	6	11.7+ "

From the statistics of the gentlemen above quoted one is forced to the conclusion that, where the location and extent of the neoplasm warrant it, the perineal operation should be the operation of choice.

I might here say that in a number of cases in which no operative interference had been employed, I have seen the patient survive from one to three years in comparative comfort through the persistent application of palliative methods. I, therefore, believe that in a large majority of inoperable cases just as much comfort and prolongation

² Amer. Med. Jour., 1902, iv, 450-461.

of life can be obtained by these methods as by the establishment of an artificial anus. By the ordinary antiseptic precautions at the time of operation, and due care in cleansing the parts with soap and water night and morning, the case can generally be kept in good condition throughout. It seems that it does not matter how much fecal material passes over the rectal wound, it does no harm and excites no inflammation. On the other hand, should any fecal material or discharge be allowed to collect for twenty-four hours in the wound or about the anal orifice, it will quickly decompose from organisms coming from without, and tenderness and local inflammation will result.

I have not been able to follow all my cases, as some have left the city, and in some the histories have been lost. There were 29 cases, 15 females and 14 males. The perineal route was chosen as the method of operation, except in 2 cases, and in those I did a combined operation. The youngest was 26 years old, and the oldest 77; 6 died within the first year, 1 met with an accident and died two years after the operation, but there was no return of the disease; 21 cases passed the three-year mark and I lost track of all except 5; 4 of this number lived over five years with no recurrence, and 1 is still living with no recurrence and in the best of health, eight years after the operation.

The most distressing symptom is pain at the seat of the disease. This pain is in no proportion to the extent of the disease, and indeed is often more intolerable from a small cancerous ulceration involving the sphincters than from extensive disease in the higher part of the rectum. Complete relief from pain is often the first and most marked result of the operation. After the operation, not only is there a cessation of pain, but also the tenesmus and blood-stained discharge cease, and the patient improves in health and strength.

If the disease returns in other organs, the suffering is usually inconsiderable, while in the event of a local return, there appears to be very little pain as compared with that caused by the original growth, a fact probably accounted for by the destruction of the terminal nerve filaments at the time of the operation.

The possibility of incontinence cannot be urged as a contraindication to the operation; for if the cancer be allowed to remain unoperated upon, incontinence is nearly sure to become a complication. In the majority of cases in which there is no return of the disease, the patient has fairly good control, unless there be diarrhea or looseness. As might be supposed when the sphincters are removed or damaged incontinence is very apt to follow. To prevent this, Gersuny has proposed twisting the gut two or three times around before it is sutured in position.

This procedure has been adopted by numerous surgeons, notably by Gerster, and seems for the time being to be quite effectual. It does not remain permanent, as in a large majority of cases Tuttle claims the incontinence returns after a longer or shorter period. In order to overcome this difficulty, Willms proposed carrying the superior segment through the fibers of the gluteus maximus muscle, thus making of it a sphincter. Others believe that where portions of the levators have been left intact, the muscles, temporarily paralyzed, probably regain their power; but when they too have been removed, the absence of incontinence requires another explanation.

Now just here the author wishes to go on record as saying that if the levatores ani are severed from the gut in the dissection, and transplanted immediately after the dissection is complete and the growth is outside of the skin margin, a sphincteric control similar to an hour-glass contraction may be obtained. This he has accomplished in 5 cases, the technique of which will be given in full in describing his method of extirpation of the rectum.

Taking into consideration that death is sure to follow if the cancer is let alone, and that no other form of treatment holds out the slightest hope, there is no question but that it is the duty of the surgeon to advise operation in all cases in which there is a reasonable probability of removing the whole disease. The operation converts the absolute certainty of death into more than a 30 per cent. chance of a permanent cure.

THE PREPARATION OF THE PATIENT.

Before describing the various methods in detail, it is important to consider the preparation of the patient, which is practically the same in each case. The patient's strength should be first increased by forced feeding with the most nutritious food, such as meat, eggs, milk and concentrated soups and broths. The intestinal tract should be freed from all hard and putrefying fecal masses, intestinal antisepsis established, as far as we may, hoping to check in a measure the purulent secretions from the growth or ulceration.

Special attention should be given to the kidneys, seeing to it that they are functioning properly. This I believe to be especially important, and it is best accomplished by insisting upon our patient drinking large quantities of pure water.

It requires about ten days to properly prepare a patient. I believe that a mixed diet is preferable to a liquid diet. Along with milk, broths and concentrated soups, scraped tenderloin steak with eggs made into a cake and thoroughly broiled makes a very palatable and nutritious food.

The patient should be fed at short intervals and as much as he can thoroughly digest.

Along with this forced feeding, and the taking of pure water to irrigate the genitourinary tract, the patient should be given a daily saline laxative, which will produce two or three thin movements of the bowels daily. To disinfect the intestinal canal we should give by the stomach some intestinal antiseptic, such as salol gr. v-x, or sulphocarbolate of zinc gr. ij, several times a day.

The rectum should be irrigated three times a day with a solution of bichloride of mercury 1:5000 or lysol 3j to a quart of warm water.

On the day previous to the operation the perineosacral region and pubis should be shaved and dressed with soap poultices for two to three hours, then washed and dressed with bichloride dressings, which should be retained *in situ* until the patient has been anesthetized.

Notwithstanding all this preparation of the patient, it is impossible to keep the field of operation strictly aseptic. So many fatalities occur from infection, either during the operation or through the giving way of the sutures and pouring out of the intestinal contents into the wound, that it is deemed wise by many surgeons to make an artificial inguinal anus as a preliminary procedure in all extirpations of the rectum.

Some surgeons make a permanent inguinal anus to begin with, closing up the distal opening of the sigmoid and dropping it back into the intestinal cavity, where it remains or is removed along with the cancer. This is Keen's idea as given in the Journal American Medical Association, August 13, 1898. Others make a temporary inguinal anus, which is closed later on, if it is found feasible to restore the fecal exit at its normal position. I have never found this necessary and I doubt the wisdom of it. The fecal current may be turned, but the secretions cannot be stopped. Again it involves a three-fold operation. I am well aware that it was frequently done a few years ago, but of late the procedure has been largely abandoned. It is further objectionable in that a temporary colotomy curtails the amount of gut to be brought down to replace the excised portion.

Bloodgood, of Johns Hopkins Hospital, makes himself clear on the subject in the following paragraph:—

"Colotomy has been performed too frequently as a primary operation. It is not indicated unless the patients are first seen in a condition of acute obstruction, or their condition is so critical from chronic obstruction that a prolonged operation is contraindicated. If possible the entire operation should be performed at one sitting."³

The author has never in any of his cases thought it wise to precede

³ Earle's work on Diseases of Rectum, p. 403.

the extirpation by an inguinal colotomy, believing that, where the cancer is low down and the caliber of the bowel sufficiently great to enable one to thoroughly empty the intestinal canal of all the fecal accumulations above it, and where it is perfectly clear before beginning the operation that it will be possible to bring down the gut from above and suture it to the margin of the anus, the procedure is unwarranted. But it is another proposition when there is doubt with regard to the possibility of accomplishing the feat of bringing the gut down to the anus. Where the extent of the growth renders it absolutely certain that the normal fecal tract can be restored, I believe a preliminary colotomy is unjustifiable and bad surgery.

In the chapter on colotomy the manner of making and closing a temporary colotomy is thoroughly explained.

It has been suggested by E. H. Taylor⁴ that when the cancer is soft and ulcerated, curettage to remove the sloughing and suppurating portions of the growth gives prompt relief. This should be followed with frequent irrigations of some antiseptic solutions, and then the extirpation by whatever method is deemed best, done. I have followed this procedure in one case, and believe that it was a wise step in the operation.

THE PERINEAL METHOD.

The patient having been duly prepared according to the technique previously given, and anesthetized, is placed on the table in the exaggerated lithotomy position with the sand-bags under the buttocks, and with the legs flexed upon the abdomen, the buttocks projecting well over the end of the table. In this position a most excellent view of the upper part of the pelvis, as far as the sacral promontory, can be secured. The sphincters are now thoroughly dilated. If the patient is a male, a large sound (24-26 F.) is introduced into the bladder and hooked well up under the pubic arch, and intrusted to an assistant; the urethra and adjoining parts are thus well steadied and delicate dissection may be done without danger of injury to the urethra, prostate, or the trigone of the bladder. The rectum having been snugly packed with gauze, which serves as a guide to prevent wounding the rectum during dissection, a circular incision through the entire wall of the gut is made within the sphincters, if they be not involved, and externally around the margin of the anus, if they are involved. This incision may entirely surround the rectum, or it may be limited to half of the circumference when the growth is confined to one side. The upper segment of the gut is then caught with traction forceps and dragged upon by an assistant,

⁴ Ann. of Surgery, 1899, vol. i, p. 385.

while the operator frees it by scissors and blunt dissection, to a point at least half an inch above the neoplasm. It is then cut transversely well above the growth, the upper segment being caught by forceps to prevent retraction. Finally this end is brought down and sutured to the lower edge of the original incision.

The cases to which this operation is applicable are extremely rare. If ever advisable, in fact, it is open to serious objections, as it is very likely to be followed by serious infection. It is much better, as suggested by Ball, to carry the incision deeply from the back of the anus to the coccyx. This is an exceedingly important step of the operation. If the entire circumference of the bowel, including the anus, is diseased, incisions should be now carried well clear of the disease around the anus and deeply into the ischio-rectal fossæ, the attachments of the levatores ani divided, and the dissection carried upward posteriorly and at the sides. This can be readily accomplished, but in front there is always considerable difficulty, owing to the close attachments of the rectum to the bladder and urethra in the male, and to the vagina and uterus in the female. In the male the sound is our guide and protector, and in the female the finger of an assistant in the vagina warns us when danger is approached.

The dissection having been carried up to healthy tissue above the disease, the rectum is amputated. Catch forceps should be at hand to seize all bleeding points. The gut is now brought down and sutured to the skin with at least four sutures taken deeply into the tissues and skin to hold the gut securely, and then a sufficient number of other sutures to bring the skin and gut neatly together, and the cavity packed with gauze coming out posteriorly. If the sphincters have been preserved, then the gut should be brought down and the proximal end sutured to the edge of the original circular incision. The wound is then packed with gauze, the end of which is brought out through the posterior part of the wound in front of the coccyx.

CRIPPS'S METHOD.

A long, sharp-pointed, curved bistoury is introduced through the anus and made to penetrate from within outward at the tip of the coccyx; all the intervening tissues are then cut through with one stroke of the knife, thus laying the rectum open up to this point. Lateral incisions are then made around each side of the rectum, either through the skin outside of the sphincters or through the mucous membrane above the muscle, according to whether the anus is involved in the neoplasm or not. These incisions should be made deep and boldly at one sweep, the wounds being immediately packed with gauze wrung out of hot water to control the

bleeding. After this the rectum is freed from its lateral and posterior attachments by scissors and blunt dissection to a point well above the growth; these parts of the wound are then packed with gauze wrung out of hot water, and the rectum is dissected off anteriorly from the perineum, urethra and prostate. This step is somewhat difficult, but with the sound in the bladder the parts are well guarded. If the growth is limited to one side of the rectum, only that portion is dissected out. After the dissection is complete, the gut is amputated above the growth by a wire ecraseur or galvanocautery loop. Unless the growth is very low, no attempt is made to bring the gut down and suture it to the anus, but a drainage tube is inserted into the upper segment, and after the hemorrhage is controlled the wound is packed with gauze. The gap between the anus and the excised gut is left to heal by granulation. (Quoted by Tuttle, *op. cit.*, p. 814.)

ALLINGHAM'S METHOD.

A long-pointed bistoury is introduced through the skin just posterior to the anus and is carried down through the postrectal tissues above the upper limits of the growth and entirely outside of the rectum. The tissues are severed from this point downward to the coccyx at one stroke of the knife; the wound is packed with sponges to control the bleeding; an incision is made all around the rectum and between the two sphincters, if the anus is not involved, and the external sphincter is incised at the posterior commissure, the muscle being left in the skin flaps. With the finger in the rectum, all the postrectal tissues are severed, using the thumb as a guide. Each side is treated in the same manner, and the wound packed with sterile gauze. The outer edges of the wound being held apart by broad, flat retractors, the surgeon is able to dissect the anterior part of the rectum from its attachments. The sound in the urethra in the male, and an assistant's finger in the vagina in the female, prevents wounding these organs. After the gut has been well dissected out above the growth, it is caught by clamps and cut off below these. Bleeding is controlled by ligatures and equal parts of hot water and alcohol.

Allingham states that "in most of our cases it was impossible to bring down the stump of the rectum to the skin; if, indeed, these parts could be brought together, the tension would be so great that the sutures would be torn out in a few hours."

The rapidity with which this operation can be done is its chief feature, but, as in Cripps's method, if the affected glands are not removed they lead to infection and prolonged granulation.

SACRAL OR KRASKE'S METHOD.

Kraske's original incision has been much modified by other surgeons. The method which appears to me to be the best is as follows:—

The skin over the sacrum is cleansed antiseptically along with the other preparation previously given, and an incision made from the middle of the sacrum to within about an inch of the anus. This exposes the fibrous coverings of the bone with the attached ligaments, and the connections of the levatores ani to the coccyx, and to one another in the middle line. An incision is now made through the musculature below the tip of the coccyx, and with bone shears the ligaments, first on one side of the coccyx and then on the other, are severed and a third section is carried transversely through the fourth sacral vertebra. The triangle of bone thus separated from its attachments is easily removed. This transverse division of the sacrum is practically that recommended by Bardenheuer, which is considered by far the best line of section. When made through the fifth sacral vertebra, sufficient room is usually secured, but a higher bone section can readily be made, if required. It is, however, of great importance to keep it as low as possible, so as to insure the safety of the nerve supply of the sphincter apparatus. The removal of the entire piece of bone is unattended with subsequent trouble, and is, I think, vastly to be preferred to any of the osteoplastic operations which have been recommended. The posterior surface of the rectum is now exposed and separated with care, bleeding, of course, being arrested. Usually only the midsacral artery requires attention. With the finger an attempt should now be made to free the anterior surface so as to clear the entire circumference of the rectum; in the female this can sometimes be done with ease, but it is usually difficult in the male. No force or bruising is permissible. If the difficulty is too great, the bowel should be divided circumferentially before the anterior connections are separated. When the disease is situated low down this incision is best made above; when high up, below; while occasionally in cases of very severe disease it may be wiser to make the incision through the infiltrated intestinal wall, subsequently removing the diseased portions from each end. The incision should be made with scissors bit by bit, pressure forceps being applied to the bleeding points. Irrigation is carried on during the whole procedure.

As soon as the entire circumference is freed the upper lumen of the bowel is closed by a suitable clamp, and we now have to decide whether the case is one in which a sacral anus should be made, a resection performed, or whether the lower portion is to be completely removed without injuring the pelvic diaphragm or sphincter appa-

ratus, and the upper portion brought out and fixed at the normal anus. Some cases must be completed by the formation of a sacral anus, while others are suitable for an operation that would secure sphincteric control with an anus normally situated. I believe that a sacral anus is necessary only in a small proportion of cases, namely, those in which the disease is extremely extensive and involves the anus to such an extent that it is impossible to retain the surrounding musculature in any useful condition; and also those rare cases in which it is found impossible to free the upper segment sufficiently to bring it down for a resection or a normally situated artificial anus.

Should the case be considered one in which a sacral anus is necessary, the upper segment is freed above the disease which is to be removed, making sure that the section traverses bowel free of infiltration. The free end is now brought out over the divided sacrum and sutured to the skin and the large cavity left by the portion removed completely closed by deep and superficial sutures. A resection with end to end union, if a fair amount of healthy bowel exists below the disease, may sometimes be a possibility, and in rare cases in which it succeeds the result is very perfect. The conditions under which the operation is performed, however, are extremely unfavorable for good union. In the first place, there is not a uniform covering of peritoneum; secondly, the solid feces of the colon make a considerable pressure upon the point of union. Dilatation of the anus for the passage of solid feces, even under normal conditions, requires a very considerable force; and if, as is usually the case, the bowels are kept confined for many days after the operation, this strain will be so great as almost to tear through the new bond of union, even if tolerably firm. It is well, therefore, if the surgeon attempts this method, to institute free saline purgation after the second or third day, and in this way, as far as practicable to the case, to establish a similar condition to that of the small intestine with its fluid contents, where we know the results of end-to-end anastomosis are so much better than they are in the colon.

The anastomosis may be made by suture or Murphy's button, at the discretion of the surgeon. It is desirable to keep as far as possible from the muscular tunic of the bowel, remembering that the vessels for the supply of the rectum pass down in the loose areolar tissue in the hollow of the sacrum, and must, as far as possible, be preserved. However, many of them are found in the submucous tissue of the gut, and the vitality of the rectum can generally be assured if great care is taken to prevent undue bruising and lacerations, and to retain as many of the vessels in the posterior areolar tissues as possible. The danger of necrosis of the intestine is the one great drawback.

Finally, after a careful and unbiased review of the sacral or Kraske's method, I desire to place myself on record as being absolutely opposed to this route in all operations for the radical removal of cancer of the rectum. The sacral route has been advised only in cases in which the carcinoma involved the upper portion of the rectum. Sacral resection has been an important item in determining the high mortality of operations for high rectal carcinoma.

In extirpation of the rectum below the peritoneal reflection, even the removal of the coccyx is superfluous. In excision of the upper rectum the peritoneal cavity must be freely opened and in such cases ample space is secured by removal of the coccyx. If excision of the coccyx does not furnish the necessary space, it is much safer to resort to the combined operation than to persist in creating additional space by sacral resection. Senn says: "I hope and trust that at least in this country the Kraske operation will soon become obsolete. The combined operation is destined to take the place of sacral resection in all cases in which excision of the coccyx does not afford the required space to reach the proximal limits of the disease with safety."

VAGINAL ROUTE.

As involvement of the rectovaginal septum occurs early in many cases, excision of a portion of the posterior vaginal wall with the cancer has been frequently practised. But how about recurrence? This must very frequently happen where the perirectal tissues are much involved. It has been advocated by many surgeons, especially Murphy of Chicago, and in suitable cases it is no doubt a good method; but I am unable to speak of it from personal experience. Murphy's technique is as follows:—

The vagina is dilated with broad retractors, the cervix drawn down and Douglas's *cul-de-sac* opened by a transverse incision just below the cervical juncture. The small intestines are then pushed upward out of the way, and the peritoneal cavity is packed with large laparotomy sponges or pads, a careful count being kept of the number used. The rectovaginal septum is then divided by a vertical incision in the median line, extending from the first incision down to the margin of the anus, and including the external sphincter. The vaginal wall is then dissected from its attachments to the rectum, thus exposing this organ in its entire length, and enabling one to examine it and draw down the sigmoid flexure almost at will. At this point he divides the anterior rectal wall up to the lower border of the tumor, and incises the gut transversely one inch below the lower limits of the growth, carrying the incision into the retrorectal tissue. The proximal end of the gut is then

grasped with forceps which close it, and by the use of curved scissors it is separated from its posterior attachments as far as the promontory of the sacrum, or sufficiently far for the bowel to be drawn down until its healthy portion reaches the lower segment without undue tension. The gut is then amputated above the growth, and the upper and lower segments are united, end to end, by silkworm sutures. These sutures should be passed from within outward, the knots being tied upon the inside, and the ends being left long to facilitate their removal. The wound in the anterior wall of the rectum is closed in the same manner, and the ends of the sphincter brought together by buried catgut sutures. After the laparotomy pads are removed, the peritoneal wound is closed with a continuous catgut suture, and the vaginal wound is brought together with silkworm gut sutures. A large drainage tube is introduced through the anus above the point of anastomosis and sutured in position, and the vagina and external parts covered with sterilized gauze held in place by a flannel T-bandage.

ABDOMINAL OR COMBINED METHOD.

Excision of the rectum from above appears first to have been performed by Czerny in 1883, in a case in which he found the perineal route to be impracticable, although its claims have been strongly advocated by Quénu and Hartman. The advantages are:—

1. After the abdomen is opened it is possible to estimate exactly the extent of the disease and the degree, if any, of lymphatic and peritoneal involvement, so that if the disease is found to be too extensive the operation can be terminated as an ordinary colotomy; or if this is considered to be unnecessary, the abdominal wound may be closed and the case allowed to run its course.

2. As the mesocolon is divided the superior hemorrhoidal artery is secured and also the two middle hemorrhoidal arteries at an early stage, so that the operation is almost absolutely bloodless.

3. A complete removal of the lymph-glands and vessels most likely to be involved is quite possible.

4. As the bowel is securely tied above and below the disease, wound soiling from intestinal contents is reduced to a minimum.

These are very important advantages which appear to me sufficient to extend largely the scope of the operation. Many cases which have been treated by transsacral incision would, I believe, have given a better result by this method, which has hitherto only been adopted in very extensive cancers of the rectum, and usually terminated by bringing out the divided colon, either at the original abdominal wound or through a separate incision in the iliac region. Of course, if it is necessary to terminate the case by a permanent colotomy, this must be considered a

very serious objection; but I am convinced that it is possible to bring the divided colon down to and fix it in the anus in a large proportion of cases without any wound whatever of the anal canal or pelvic diaphragm, and so obtain perfect sphincter control.

The operation is best conducted as follows:—

The preliminary preparation having been carried out as previously given, the patient is placed in the Trendelenburg position, as nearly vertical as possible, in order that the intestines may fall out of the pelvis so as to give plenty of room. The abdomen is opened by a long vertical incision which separates the fibers of the left rectus muscle, and the extent of the disease is determined. If movable, and if the peritoneum is free from invasion, excision may be proceeded with. A loop of the pelvic colon is drawn out and the point at which the mesocolon is longest determined. The average greatest length is about six inches, and if found as long as this, the divided colon can be brought down to the anus without undue tension. If, however, it proves to be considerably shorter than this limit, the case will probably have to be terminated by colotomy. The colon is ligatured in two places firmly and divided, the cut ends being tied up in aseptic gauze. It will be observed that the point selected for division has no direct reference to the seat of the disease. It is chosen so as to give as long mesocolon as possible. The mesocolon is now divided between clamps down to its attachments and if the Paquelin cautery is used, top sewing of the divided edge is rendered unnecessary. The attachments of the lower portion are ligatured piece by piece, and divided until a point is reached at which the posterior surface of the rectum ceases to be covered by peritoneum. The superior hemorrhoidal artery will have been ligatured in the lower portion of the mesocolon thus tied. The lateral ligaments are then tied with the peritoneum covering them and divided; these will include the middle hemorrhoidal artery upon each side. The peritoneum in front, as it is reflected off of the front of the rectum, is now divided, thus completing the separation of the peritoneum from the rectum. By blunt dissection the bowel can be cleared right down to the pelvic diaphragm, and often firmly ligatured below the seat of the disease. An assistant should now thoroughly wash out the anal canal and rectum up to the point at which it is ligatured, after which it may be divided from above, below the seat of the ligature. The end of the colon is now brought out at the anus and fixed there after the mucous membrane of the lower segment has been dissected away. This I believe preferable to any end-to-end union for reasons already given. If it is thought desirable to employ drainage, an incision for the insertion of a tube of iodoform gauze can be made through the pelvic diaphragm at the tip of the coccyx.

I have so far had personal experience in only two cases of the above operation, both being very extensive. There was no difficulty in bringing down the pelvic colon to the anus, as above described. The first was a case in which there had been long standing obstruction and the patient died from shock in thirty-six hours, too soon to know whether union of the colon to the anus would have taken place, or what the functional result would have been. The second died on the fifth day. The union was imperfect and sepsis followed.

When the mesocolon is too short, the operation must be completed by colotomy, which should have been done in the second case above referred to.

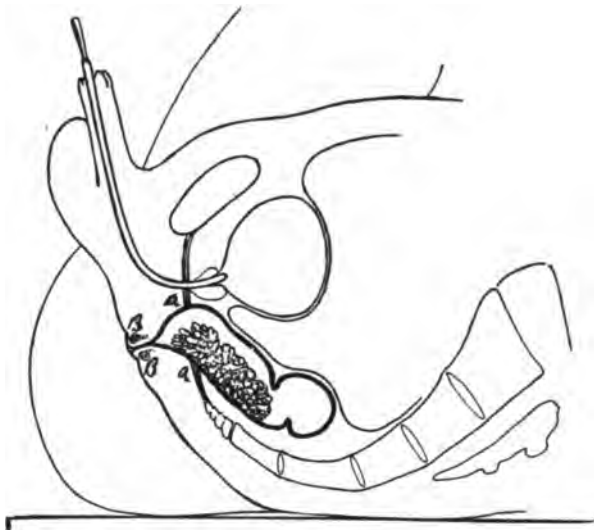


Fig. 160.—Evans's method. Sound in position. Extent of growth.
The attachment of levators, *a a*.

EVANS'S METHOD.

The patient after being properly prepared is anesthetized and placed in the lithotomy position, the hips being well elevated by cushions under the buttocks, or by inclination of the table; the rectum is then well irrigated with sterile water, and dried out, and loosely packed with gauze in order that one may recognize a close approach to its walls during dissection. A sound is now passed into the bladder, if the patient be a male. or the fingers of an assistant into the vagina, if a female. Fig. 160 represents the sound in position, the extent of the growth, and the anatomical relations of the levator ani muscles. A circular incision is now made through the skin around the anus (Fig. 161), and this is dissected

up outside of the sphincters to the extent of about one inch (Fig. 160, *B*). Around the cylinder thus dissected loose a strong silk ligature is tied, the ends of which are left long for the purpose of traction. The dissection is then continued posteriorly to the tip of the coccyx and well into the retro-rectal space, freeing the rectum from all of its attachments (Fig. 162, *a a, b b*). The wound is then packed with gauze wrung out of hot water to check whatever hemorrhage there may be. The rectum is then freed laterally (Fig. 162, *a a, b b*), and the incision packed likewise. With the traction sutures the rectum is drawn backward and outward and dissected loose anteriorly up to the level of the levator ani, which is much higher here than posteriorly. The packing is now removed and you will

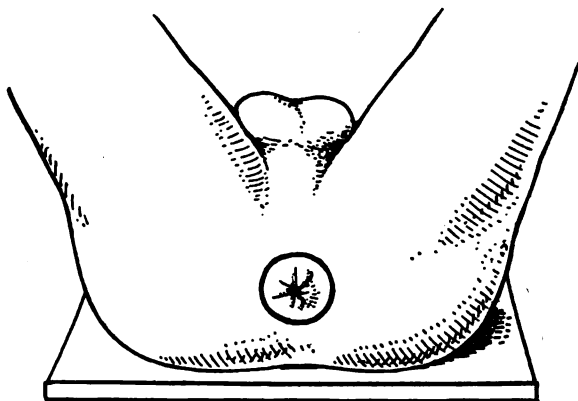


Fig. 161.—Evans's method. Circular incision around the anus.

find little or no bleeding. The finger is then introduced from behind forward above the anterior fibers of the levator ani, and the deep perineal fasciæ, and by gentle dragging downward these are separated from the rectum in the line of cleavage.

A curved needle armed with a strong silk suture is passed through the levator ani on either side and the suture tied and turned over to an assistant to be used later. This is repeated on the opposite side (Fig. 164, *A A*). When this has been accomplished on both sides and above, the attachments of the levator to the rectum are cut through upon the finger and the rectum is free in its entire circumference (Fig. 164). The ligatures in the hands of the assistant prevent the levators from retracting out of reach. This accomplished, the operator with his finger separates the rectum from the cellular tissues in the superior pelvic-rectal spaces until the peritoneal *cul-de-sac* is reached in front. At this point the lateral connective-tissue folds which support the rectum on the sides must be clipped with scissors, and then the gut usually descends well

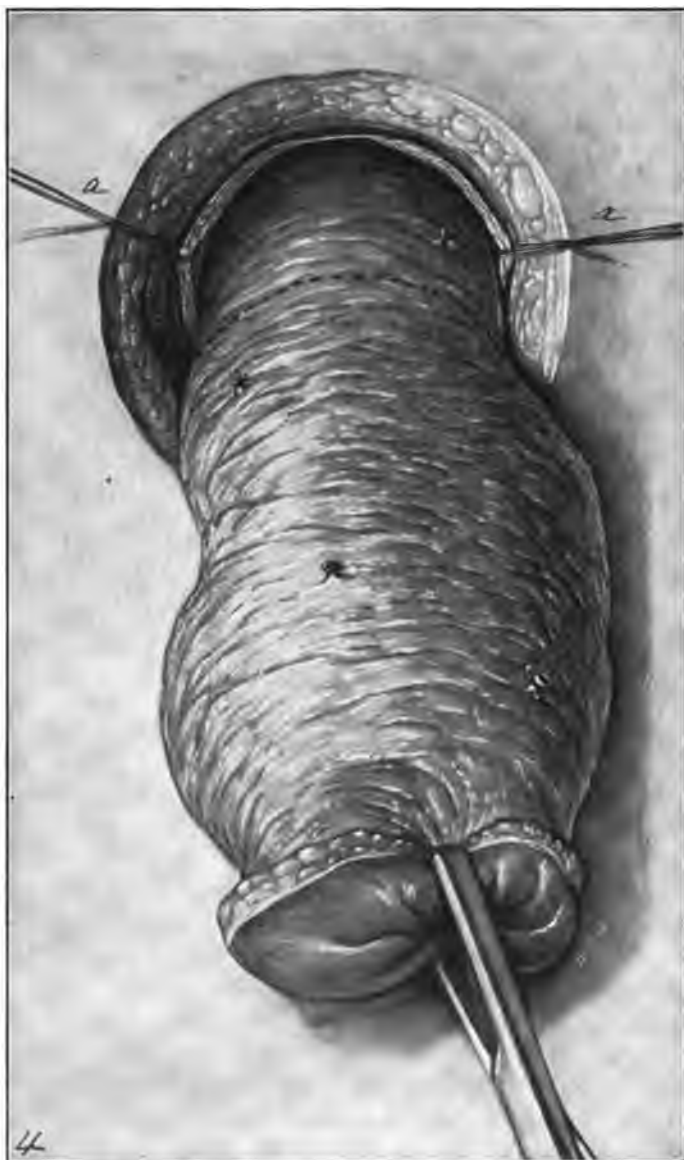


Fig. 162.—Evans's method. Growth outside of the anus, the attachment of the levators and the traction sutures, *a a*, in the levators.

outside of the wound (Fig. 164). If the growth is now well outside of the wound, the closing steps of the operation may be proceeded with. If not, the peritoneum should be stripped off from the rectum and its cavity need not be opened, but if the growth is above this, it is better to open the peritoneal cavity at once. The rectum is now separated from coccyx and sacrum by breaking up the cellulofibrous attachments with the fingers and scissors up to the mesorectum close to the sacrum in order to avoid wounding the inferior mesenteric artery. When the gut has been sufficiently loosened above, one should proceed to close the peritoneum and restore the planes of the pelvic floor down to the levators

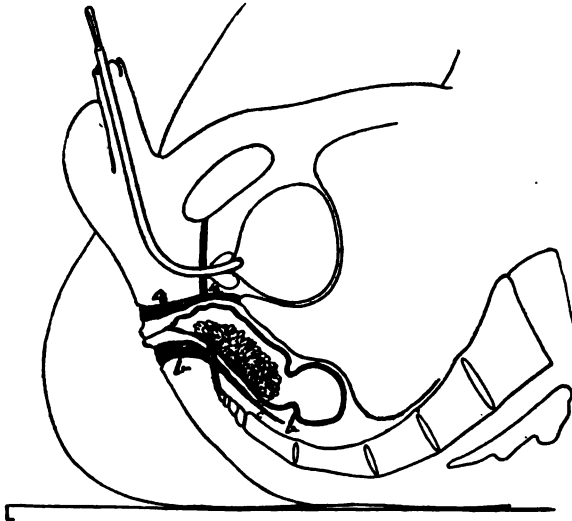


Fig. 163.—Evans's method. Dissection from anus to one inch above the growth.

with fine catgut sutures. By the traction sutures attached to the levator ani (Fig. 164), the levators are drawn down and reattached to the gut with continuous chromicized catgut sutures No. 0 to 1 (Fig. 164). After this has been accomplished a stab wound is made through the wound out through the skin in front of the coccyx, and through this stab wound the whole cavity or wound is packed with strips of iodoform gauze snugly (not too tight—as shown in Fig. 165). I believe it best to pack the wound with separate strips, leaving the ends long enough to extend out of the wound so as to be easily accessible, and thereby be enabled to remove only a portion of the gauze packing at a time, and not disturb the granulations of the whole wound at once. This plan renders hemorrhage less likely. The gut is now cut off 1 inch to 2 inches or more above the growth and four sutures of strong silk are

passed anteriorly, posteriorly, and laterally through the gut and skin, thus securing it firmly to the skin (Fig. 164). The skin and gut are now brought together neatly with a continuous chromicized catgut suture (Fig. 166). A small drainage-tube may now be introduced and fixed to allow the passage of gas. The transplanting of the levators to the gut

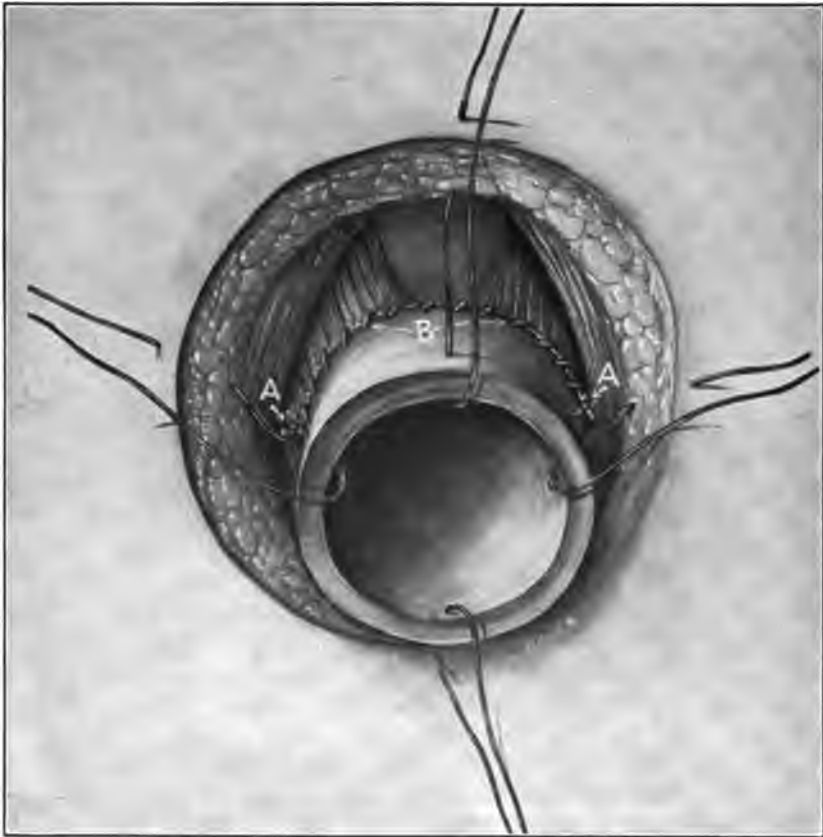


Fig. 164.—Evans's method. Transplantation of the levators to the gut by means of No. 1 chromicized catgut sutures.

has in five cases formed a sphincter of the hourglass character (Fig. 167), and given my patients absolute control except in cases of severe diarrhea. In Fig. 167 the point of contraction is at A, the point of attachment of the levators. Anatomically the levators are constrictors and elevators, and this anatomical fact led me to attempt the transplantation of the levators to form the so-called third sphincter.

If the sigmoid is the receptacle for fecal material, as some authors

claim, then the author believes there must be a cause, and that cause an anatomical one. By this transplantation I have in five cases successfully formed a third sphincter without entering the peritoneal cavity. In the sixth case in which I followed this technique I was obliged to enter the peritoneal cavity in order to bring down the disease externally to the anus without tension. Peritonitis followed and the patient promptly died. In the seventh case I performed the combined operation, and the patient died from profound shock in a few hours. The five patients were all over 60 years of age and lived more than three years. One lived over five years without a recurrence; one over six years without recur-

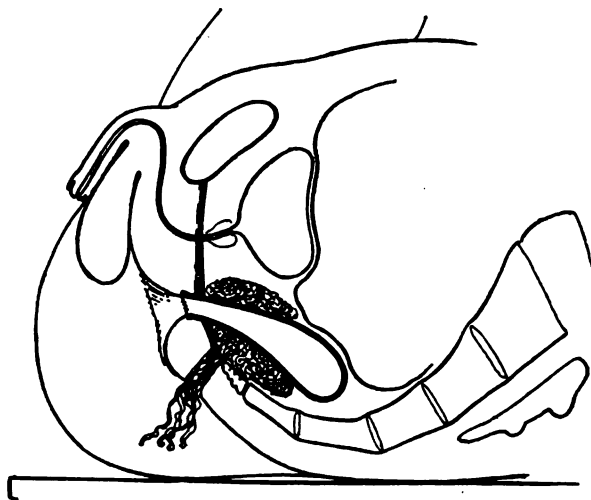


Fig. 165.—Evans's method. Point of attachment of the levators forming the third sphincter. Packing in place, the ends of the gauze coming out in front of the coccyx.

rence in the pelvis, but there was liver metastasis. One is still living, eight years since the operation, in most excellent health. All of these cases had excellent control of the bowels except at times of diarrhea. I believe this is an advance in rectal surgery and especially in extirpation of the rectum for malignant growths. The gauze drainage is placed posteriorly to the anus and anteriorly to the coccyx in order to keep the field of operation around the anus clean; and provide for better drainage. The sutures around the anus are left for seven days, unless otherwise indicated. The strips of gauze are removed singly, as indicated, and the cavity irrigated with lysol solution, 1 dram to a pint of water, every day, and as much oftener as is necessary to keep the wound clean.

Application of "T" Bandage.—To put this on neatly and comfortably is important. Patients are quite unable to appreciate the delicacy of the most brilliant operation, but they are perfectly cognizant of whether the bandage cuts them or is uncomfortable, and value the skill of the surgeon accordingly. The bandage should be of flannel, the waist band

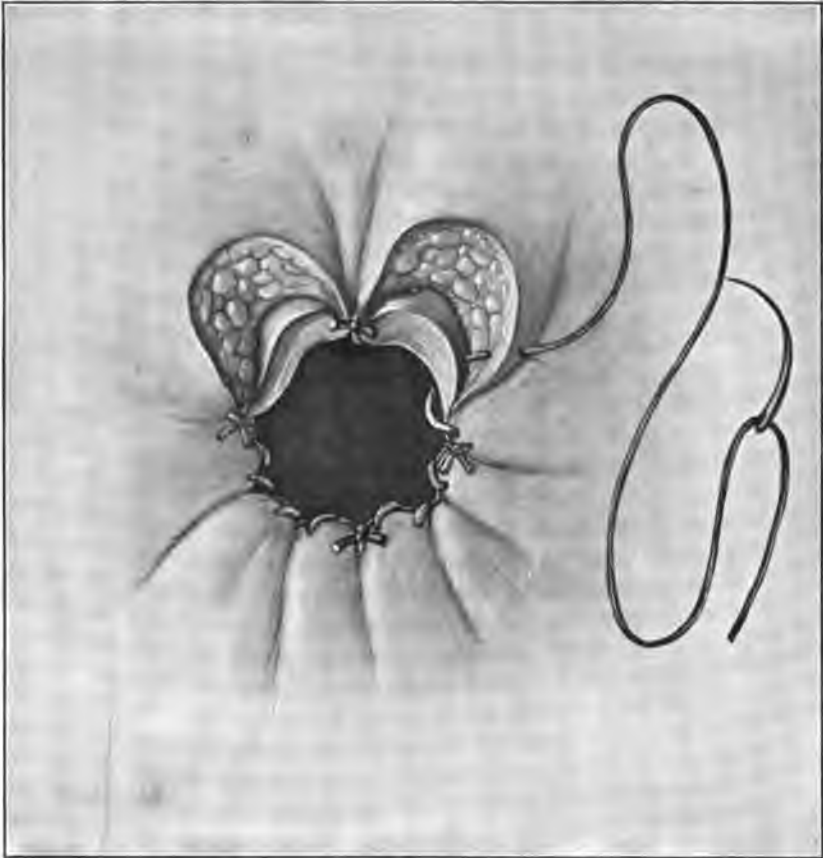


Fig. 166.—Evans's method. Partial suturing of gut to skin.

being of double thickness, six inches wide, placed well above the hips. It should be drawn tightly and pinned neatly. The two "T" pieces are then drawn over the dressings between the legs, and pinned eight inches apart to the waist bandage. The bandage should be pinned, knots and bows always being uncomfortable.

The operation, as just described, is for the removal of the whole circumference of the bowel. In the cases reported the sphincters were

involved, or the growth was in such close proximity to the internal sphincter that the author did not deem it wise to try to preserve them.

DEDUCTIONS.

There is a general agreement among modern surgeons that in the treatment of rectal cancer, as of most of the cancers of the other organs, radical removal is the method of choice, and the only effective means of affording to the patient a definite cure, or at least, an appreciable survival. It is shown by statistics that, as a result of strict asepsis and improved methods of technique, the direct mortality of this

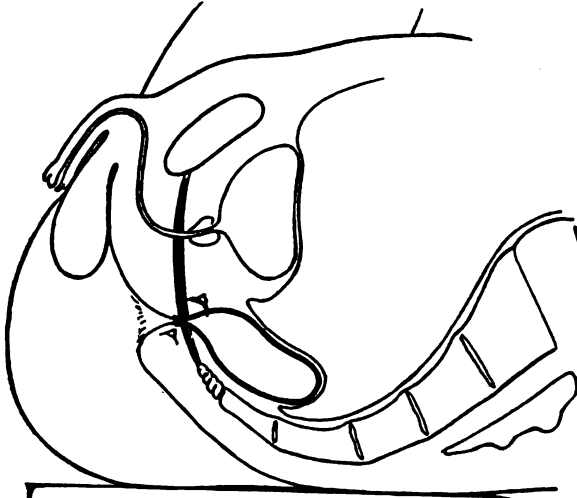


Fig. 167.—Evans's method. Third sphincter, *A A*.

operative treatment has been reduced from 40 to 20 per cent., and that the average of curable cases, the limit of three years being taken, is now about 23 per cent. Though the results of the radical operation in regard to completeness and the duration of the cure may often be disappointing, such intervention, when applied under favorable conditions is, the author believes, always likely to prove beneficial, and it certainly constitutes the best method of palliative treatment.

In too many instances unfortunately the patient comes for the first time under the notice of the surgeon when it is too late to operate. The delay in diagnosing rectal cancer, and of realizing the necessity of an early operation, cannot always be laid to the charge of the patient, as it is often the result of the surgeon's omission to practice careful digital and rectoscopic examination in every case even of an apparently mild and almost inappreciable affection of the lower bowel.

Consideration of the reasons which render the radical treatment justifiable, and of the necessity of an early operation, should, the author believes, as already pointed out, be based on correct ideas of the anatomical extent of the rectum, and especially of its superior limit. The latter is situated at the level of the third sacral vertebra, and corresponds to the posterior reflection of the *cul-de-sac* of Douglas, and to the lowest part of the mesosigmoid. The limits of free and radical intervention in cases of extensive and advanced malignant disease are now very wide, and every case of rectal cancer ought to be submitted to operation, if such course be possible. Advanced age of itself the author does not regard as a contraindication. It is very necessary, in an old patient, to be quite assured, before operating, of the functional competency of the heart, lungs and kidneys. By reason of certain differences, both anatomical and physiological, between the two sexes, the conditions favorable to operative interference are more frequently met with in women than in men. In the former the pelvis is larger, the pelvic peritoneum more resistant, and, generally speaking, the operation less difficult and not so formidable.

Albuminuria, when abundant and persistent, forbids any operative treatment, as does also glycosuria, unless it be very slight and can be readily controlled by internal remedies. The author insists on the importance of searching for sugar before deciding on an operation, as glycosuria is an occasional complication of rectal cancer.

In regard to the influence of the local conditions on the choice of treatment, it is held at the present day that the height of the seat of rectal cancer does not *per se* constitute an operative contraindication. The extension of the disease along the axis of the bowel has far less importance than its peripheral extension. Perirectal adhesions are often purely inflammatory, but in actual practice there seems to be great difficulty in distinguishing between these and adhesions of a neoplastic nature. Firm adhesions of a cancerous rectum to the prostate should be considered an absolute contraindication. The author is opposed to the idea of any intervention if the bladder be involved. Adhesions to the uterus or its appendages contraindicate removal of the rectum.

The Kraske method, the author believes, should be condemned emphatically. He believes the technique of the perineoabdominal operation, as laid down by Tuttle, supplants the Kraske. The transplantation of the levator-ani muscles, as detailed in the author's technique of extirpation of the rectum, to produce sphincteric action at the point of attachment when the sphincters have been removed, is a step in advance in rectal surgery.

CHAPTER XXII.

Rectal Pathology Due to Extrarectal Causes.

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IN diseases of the rectum the symptoms for which relief is most frequently sought are pain, discharge, hemorrhage, protrusion, and pruritus. These symptoms, unfortunately, are still regarded by some practitioners to be synonymous with the term piles, and no examination, either ocular, digital, or instrumental, is considered necessary for the making of a diagnosis. The result is that in diseases of no other part of the body are so many "snapshot" and blind diagnoses made as in those of this region. The first essential, therefore, in the treatment of any disease of the rectum is a correct diagnosis. The employment of the ordinary methods of examination and investigation (and this includes the aid of the pathologist) should enable the physician or surgeon to diagnose correctly any pathologic condition of the rectum. However, before undertaking any surgical treatment of the rectal pathology, he should, if possible, endeavor to determine its true etiology. If his examination and investigation, no matter how carefully and thoroughly made, are confined exclusively to the rectum itself, he will not infrequently overlook the real causative factor of the rectal pathology. If he is content to limit his investigations to the rectum, believing that all rectal pathology is due to intrarectal causes, he will undoubtedly meet with failure from his treatment in no small percentage of cases. Dr. A. B. Cooke¹ says: "To this end the first requisite in all cases is to realize that we have to do with a patient, not merely with a rectum. The one feature of specialism in medicine most to be deprecated is the tendency to contract the mental horizon. Exclusive study of a single organ and its diseases undoubtedly narrows the point of view, until, not infrequently, its relation to other organs and to the body as a whole is lost sight of."

¹ The Proctologist, June, 1907, vol. i, No. 2, p. 35.

In reviewing the literature of diseases of the rectum, one is impressed with the somewhat startling paucity of articles pertaining to the extrarectal causes of rectal pathology; and it seems rather remarkable that this subject should have received so little consideration at the hands of the proctologist and surgeon. That it is a most important



Fig. 168.—Normal pelvis, showing visceral relations in the male.

subject will not be denied by any surgeon who has had considerable experience in the diagnosis and treatment of the diseases of the rectum, and it is certainly deserving of much more serious consideration in the future than has been given to it in the past. While the pathologic conditions themselves have been fully discussed in previous chapters, the writer is unacquainted with any other work devoted to diseases of the anus and rectum, or general surgery, in which a separate chapter has been given up wholly to the consideration of rectal pathology due to extrarectal causes.

As previously stated, the rectal pathology can be diagnosed correctly, but the determination of its etiology demands more than an examination or investigation confined exclusively to the rectum itself. The rectal specialist should not be content with the correct diagnosis of the pathology, but should exert every effort to ascertain its real cause. He should undertake no radical treatment until he has fully satisfied himself as to whether the cause of the rectal lesion is intra- or extra- rectal in character. This implies a most careful examination and investigation of the patient as a whole, and especially of the abdominal and pelvic viscera. Dr. James P. Tuttle² says: "The rectal specialist must therefore practically be an accomplished gynecologist and genitourinary surgeon. He may not do the operative work of such, but as far as the diagnostic knowledge is concerned he should possess it in both branches." Such an examination will necessarily mean the devotion of much time and study to every case of rectal pathology, if its etiology is to be determined correctly. It is quite true, that in many cases, correct and properly applied treatment will prove such an examination to be wholly unnecessary; and yet, if only in an exceptional case the rectal pathology is ascertained to be due to an extrarectal cause, this knowledge, in itself, will enable the surgeon to combat more successfully the rectal lesion, and it certainly will more than repay for the seemingly tedious and somewhat prolonged method of examination which he has employed. For example, a case is seen in which hemorrhage from the rectum is the chief or only symptom presented. A rectal examination reveals ulcerations which explain the source of the hemorrhage. However, if the examination or investigation is carried no further, the etiology of the ulcerations may not be ascertained. The writer has seen not a few cases of rectal ulcerations, in which an examination of the pelvic viscera and even of the patient as a whole has been absolutely essential for the determination of the true etiology of the rectal lesions. In some of the cases, a pelvic tumor was found to be pressing firmly against the rectum, and the removal of the tumor caused a rapid subsidence of the rectal pathology and its attending symptoms. In other cases, the rectal pathology was traced to diseases of the abdominal and even of the thoracic viscera. In such cases as these, any treatment directed exclusively to the rectal pathology itself would certainly have proved futile so far as successful permanent results are concerned. In other words, successful as well as permanent results must necessarily imply the removal of the real causative factor of the rectal pathology.

In some cases symptoms are frequently referred to the rectum due to disease elsewhere, and in which an examination reveals no pathologic

² Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 109.

lesion of the rectum itself. This chapter, however, has only for its consideration those cases in which the symptoms are the expression of an existing rectal pathology due to some extrarectal cause. In order to explain how extrarectal pathology may and does produce rectal pathology, a brief review of the pelvic cavity and its contents is expedient.



Fig. 169.—Normal pelvis, showing visceral relations in the female.

In both sexes, the viscera of the pelvis comprise the rectum, the bladder, the lower portion of the ureters, coils of the small intestine, the sigmoid flexure, vessels, nerves, fasciæ, and peritoneum. In addition, in the female pelvis (Fig. 169) are the urethra, vagina, uterus, ovaries, and the Fallopian tubes; in the male pelvis (Fig. 168) are the prostate gland, prostatic urethra, vasa deferentia, and the vesiculæ seminales. Through the rectum, in the male, Cowper's glands (when inflamed), the prostate gland, the base of the bladder, the seminal vesicles, the spermatic ducts, and the contents of the rectovesical pouch may be palpated; in the female, the

uterus, the ovaries, the Fallopian tubes, and the contents of the recto-vaginal pouch may be felt. In both sexes, the coccyx is easily palpated, and when an inflamed appendix projects downward into the pelvis it may be felt through the rectum. Therefore, from the very close relations of the various pelvic viscera to each other, it is easy to understand how pathologic lesions of one may easily and readily involve its neighbor. Rectal pathology due to extrarectal causes may be classified as follows:—

First. The invasion of the rectum by malignant disease of the adjacent pelvic viscera.

Second. The long continued, unnatural and direct pressure of some pelvic organ against the rectum. In these cases, the rectal lesions are produced mechanically, and while of very frequent occurrence, the real causative factors are oftentimes unrecognized.

Third. Vascular and lymphatic extension from chronic inflammations of the various pelvic viscera.

Fourth. Indirect pressure through the blood column, as in cardiac, hepatic, and splenic diseases.

Fifth. Undue straining traceable to the presence of urethral stricture, vesical calculus, cystitis, etc.

The symptoms of rectal pathology, due either to intra- or extrarectal causes, are practically identical in so far as they are referred to the rectum itself. The same is true of the pathology so far as it is confined to the rectum; but when the rectal lesion is the result of an extrarectal cause, and especially when it is produced mechanically, the obstipation, usually regarded by both the patient and the attending physician as a simple constipation and treated indefinitely as such, is as a rule the initial symptom. Unfortunately, both for the physician and patient, the real import and significance of this obstipation is not recognized until the rectal pathology, such as proctitis, ulcerations, hemorrhoids, fistula, organic stricture, etc., has made its appearance. No one who has either enjoyed the privilege of observing his confrères in their operative treatment of gynecologic and genitourinary lesions, or has himself performed much pelvic surgery, can fail to appreciate the very conspicuous part that diseases of the various pelvic viscera play in the production of rectal pathology. From a personal experience, and fortunately having had an unusual privilege of observing much pelvic surgery performed by colleagues of larger experience, the writer is of the opinion that rectal pathology is much more frequently produced by extrarectal causes, and these causes overlooked, than is generally recognized. Both the gynecologist and genitourinary surgeon, unconsciously it may be said in not a few cases, effect a cure of an existing rectal pathology by the removal of its

extrarectal cause. Unless prominent symptoms are referred to the rectum, no rectal examination is made, and the undetected pathology is not infrequently cured by the removal of its real causative factor. On the other hand, the rectal specialist detects and diagnoses the rectal pathology, but not infrequently fails to recognize its extrarectal cause. As a result, he cannot expect to secure a permanent cure of a rectal lesion by any treatment if he fails to detect and remove the cause. The common tendency is to limit our examinations and investigations to the field of work in which we are most interested. Before undertaking any operation of election, and this would include most of the operations for the relief and cure of diseases of the rectum, a careful study and examination of the patient as a whole should be made in order that as correct a diagnosis as possible may be secured. The proctologist will occasionally fail in his diagnosis even after he has made a most thorough study and examination of his patient; but most of his incorrect diagnoses are the result of examinations which are superficial and made hastily, rather than of any lack of knowledge on his part. Successful results in the treatment of diseases of the rectum is the goal to which every proctologist should aspire. Dr. A. D. Whiting³ says: "A surgeon cannot conscientiously do his best to keep, to hold, to preserve the life and health of an individual unless he studies the case as carefully as time will allow, arrives at a diagnosis as nearly correct as possible, and then considers the *pros* and *cons*, the indications and contraindications to operative procedure before he advises or even consents to operation." Unusual previous successes in the treatment of rectal diseases should be no excuse for not making a careful and thorough examination and investigation of every future case presenting some rectal lesion. Dr. Maurice Richardson⁴ gave expression to a great truth when he said: "No success is so great that it may not be greater; no achievement so brilliant that its brilliancy may not be marred; and no error so palpable that it may not be committed." In this chapter, the writer, by seemingly unnecessary repetition, endeavors to emphasize one truth which he believes that every one practicing rectal surgery should bear in mind, namely, that rectal lesions are much more frequently produced by extrarectal causes, and these causes overlooked, than is generally recognized. The truth of this statement will be confirmed by every proctologist of considerable experience. No pathology of the rectum, therefore, can be considered to be adequately diagnosed unless its etiology has been determined. If the true etiology is not ascertained, any treatment directed toward the

³ The Jour. Amer. Med. Assoc., February 8, 1913, p. 427.

⁴ *Ibid.*, p. 425.

rectal pathology will not be attended by successful permanent results. The rectal specialist should not confine his examinations and investigations to the rectum itself; he should not be content with the determination of the pathology and undertake surgical treatment without making every effort to ascertain its real cause. He must recognize normal as well as abnormal organic conditions; his judgment must not lead him into the undertaking of impossible or injudicious operations; he must have a thorough working knowledge of the diseases of the various pelvic viscera; and, finally, he must be capable of successfully meeting any of the complex problems incident to disease of the pelvic organs, or refer his cases in which rare combinations of pathologic conditions are present to surgeons who are capable of caring for them.

Proctitis.—The diagnosis of proctitis, or inflammation of the rectum, is easily made by the ordinary methods of examination. As to whether it is the acute catarrhal, chronic hypertrophic, or chronic atrophic variety may be determined without much difficulty. This information, however, is insufficient for rational therapeutics in all cases. The possibility of an existing extrarectal cause must not be overlooked. It is very frequently associated with the extensive adhesions which are the result of an old pelvic cellulitis. As a result of vascular and lymphatic extension from chronic inflammation of the pelvic organs, it may be caused by inflammation of the uterus and its appendages, the prostate gland, the seminal vesicles, etc. The rectal specialist must not overlook abdominal tumors, displacements, enlargements, and tumors of the uterus, ovarian tumors, enlarged prostate, etc., in fact, anything which causes undue and unnatural pressure upon the rectum. This direct pressure, if long continued, will cause a congestion and produce an inflammation which will spread in all directions. Dr. James P. Tuttle⁵ says: "Adhesive bands (Fig. 170) which contract the colon or which rub against it during peristaltic action may cause congestion, thus setting up a hyperemia and hyperplasia, which eventuate in the hypertrophic form." He⁶ further states: "Movable kidneys, especially those which slide up and down with every respiration and rub against the ascending or descending colon, may induce, or certainly they may keep up, an inflammatory condition of the large intestine which may extend to the rectum." It is essential, therefore, in the treatment of any case of proctitis that the causative factor be determined.

Ulcerations.—Ulcerations of the rectum are easy of diagnosis and in every case it may be said that they are preceded by a proctitis. As

⁵ Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 147.

⁶ *Ibid.*

a result, they are not infrequently due to extrarectal causes. Of these may be mentioned inflammations of the various pelvic viscera, pressure by too large or badly fitting pessaries, pressure by a displaced or gravid uterus, or by tumors (Fig. 171) of any of the pelvic organs, etc. The ulcerations are usually the result of prolonged pressure upon the rectum. This pressure interferes with the circulation and causes a sloughing of the rectal mucosa. The writer has seen several cases of extensive rectal ulcerations which were due to pressure by large uterine fibroids, and

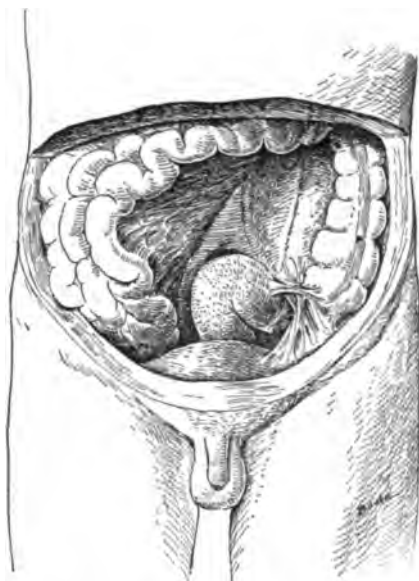


Fig. 170.—Adhesive bands constricting the sigmoid flexure.

which were readily and permanently cured by the removal of the extrarectal cause. One case he recalls very vividly, of a young lady who had suffered severely from a marked retrodisplacement of the uterus. Her attending physician had endeavored to correct the displacement by the introduction of a too large as well as a badly fitting pessary. After wearing this pessary continuously for eight months, it never having been removed even for cleansing purposes, the patient consulted the writer for a rectal disease of which pain and hemorrhage were the chief symptoms. A careful examination revealed extensive ulcerations of the rectum. The removal of a dirty, foul smelling pessary and palliative treatment applied to the ulcerations caused a rapid subsidence of the rectal symptoms and a complete cure of the pathology which had produced them. Appropriate treatment was then

directed toward the uterine displacement. Such examples of rectal ulcerations due to extrarectal causes are familiar to every proctologist.

In addition to the extrarectal causes already enumerated, the rectal specialist should not forget the possibility of an existing ulceration of the rectum being associated with and probably due to a nephritis, a diabetes, a cirrhosis of the liver, etc. The writer has met with two cases in which rectal and colonic ulcerations with copious hemorrhages from the bowel were associated with chronic parenchymatous nephri-

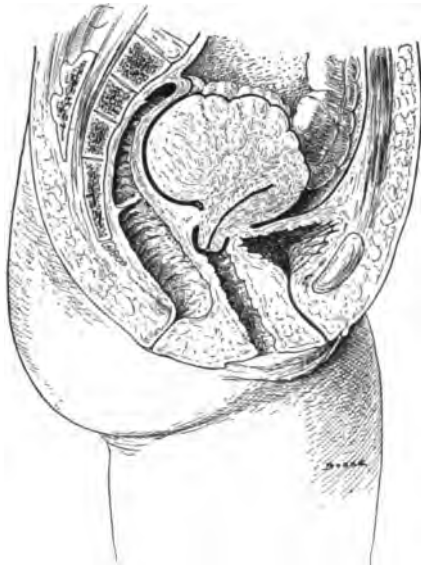


Fig. 171.—Uterine fibroid producing partial obstruction of the upper rectum and sigmoid flexure.

tis. The rectal and colonic symptoms appeared rather suddenly in otherwise apparently healthy individuals, and it was not until after the appearance of the hemorrhages from the bowel that the nephritis was diagnosed. Both patients died within a few days after the onset of the rectal symptoms. It is a question that cannot be positively affirmed or denied as to whether the nephritis was the real causative factor in the production of the ulcerations of the colon and rectum. In both of the above-mentioned cases the renal disease was regarded by the writer as the real cause of the colonic and rectal pathology.

Anal Fissure.—Of the causes of anal fissure, the most common is constipation. The extrarectal causes, therefore, would include all diseases or conditions which tend to produce obstipation, such as displace-

ments, enlargements, and tumors (Fig. 172) of the pelvic viscera, injury by the child's head during parturition, anterior deviation of the coccyx, etc. In fact, any pathologic condition of the pelvic organs which produces prolonged straining at stool may act as a predisposing cause of anal fissure. Surgery as a rule gives most excellent results in the treatment of this exceedingly painful and irritable ulcer, yet the possible existence of an extrarectal causative factor should not be overlooked. Allingham⁷ says: "Fissure is frequently the sequel of a confinement, and is com-

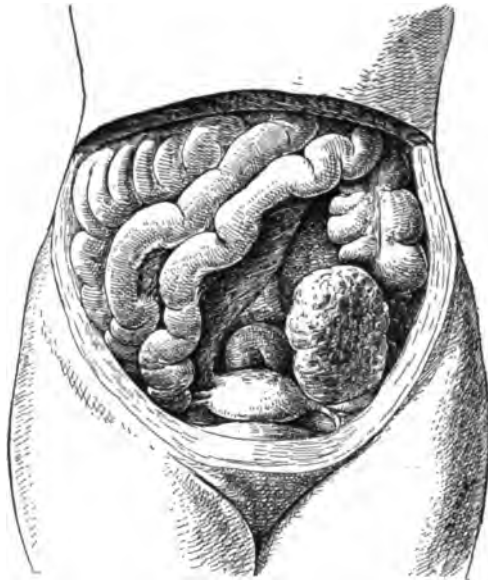


Fig. 172.—Ovarian tumor producing partial obstruction of the sigmoid flexure.

monly caused or aggravated by uterine displacement. Operations upon hemorrhoids under similar conditions are not satisfactory; the same observation applies with quite as much truth to fissure and uterine disease. The successful treatment of the uterine disorder may be sufficient to cure the fissure (if no polypus exist), or at all events the ulcer will afterwards yield to local applications and general treatment. If the fissure should be benefited by operation, as long as the uterine malady exists there will be a constant danger of a relapse taking place. The most common forms of uterine displacement in connection with fissure are, according to experience, anteversion and retroversion, and associated with these we have affections of the bladder, chronic cystitis, and spas-

⁷ Diseases of the Rectum, 1896, p. 261.

modic pains in micturition. When these three disorders are united, the case will call for all skill and patience to bring it to a successful issue."

Abscess and Fistula.—Since all fistulas, with but very few exceptions, originate in abscesses, the extrarectal causes of the abscess must necessarily be the same for that of the resulting fistula. From the number of patients who undergo one, two, three, or even more operations for the cure of a fistula, it would apparently seem that the treatment necessary for its cure is imperfectly understood by not a few men who are doing rectal surgery. However, it is more probable that instead of a lack of knowledge as to the treatment, these surgeons fail to appreciate the important rôle that extrarectal pathology may and does play in the causation of rectal fistulas. The mere fact that we find one, two, or several fistulous openings near the anal margin or in its neighborhood does not necessarily imply that there is an opening in the rectum or that any rectal pathology is present. The fistulous tract may completely encircle the rectum with no connection whatever with it or the anal canal. Its origin, by careful examination and investigation, may be traced to the posterior urethra, the prostate gland, the glands of Bartholin, the Fallopian tubes, the ovaries, suppurations of the broad ligaments, necrosis of the pelvic bones, dermoid cysts, psoas abscess, etc. The origin of a rectal fistula has a most important bearing upon its correct treatment, and a careful search for the same should never be neglected. It is a well-known fact that the so-called complex fistulas may have their origin in organs other than the rectum. An existing urethral stricture, deep urethritis, or inflamed prostate, in the male, or evidence of pelvic inflammation, in the female, should make the rectal specialist somewhat suspicious that the origin of the fistulous tract is other than intrarectal in character.

Complicated Fistula.—This type of fistula is one in which the anus and rectum have connection with other organs. It may also originate from diseases of the pelvic bones, vertebræ, etc. As a result of necrosis of the bones of the pelvis or vertebræ, tuberculosis and osteosarcoma of these bony structures, etc., there may be abscess formation and subsequent fistulas which may open in the perianal region or into the rectum itself. An abscess, the result of coccygeal or sacral disease, usually involves the retrorectal space and finds outlet in the posterior quadrant of the perineum. On the other hand, an abscess resulting from disease of the other pelvic bones and the vertebræ is very likely to open either into the rectum itself or in the anterior quadrant of the perineum. In some cases an abscess which is the result of disease of the lower lumbar vertebræ may burrow between the peritoneal folds which form the meso-

rectum, and a fistula leading into the retrorectal space is formed. Dr. Ralph W. Jackson ⁸ has reported the occurrence of a pararectal abscess, originating in tubercular disease of the hip-joint, pointing into the rectum, and leaving a suppurating sinus of indefinite duration connecting the joint with the bowel. The determination, if possible, of the real origin of a complicated fistula very naturally has a most important bearing upon its treatment, and no effort should be spared in the search for possible existing extrarectal causes. Recently, the writer operated upon a case of rectal fistula, of fifteen years' duration, the real cause of which was a necrosis of the coccyx, and the end-result of which was a retrorectal abscess and a rectal fistula. Although of many years standing and with all the symptoms referred to the rectal and perirectal regions, and in addition, with a history of repeated abscess formation with subsequent drainage into the rectum, not one of the several physicians and surgeons whom she had consulted for relief had ever made other than an ocular examination of the parts to which the symptoms had continuously been referred. The removal of the diseased coccyx and fistulous tract in this case resulted in a complete cure.

The complicated rectal fistulas connecting with other organs are mostly urinary and genital in character. In the female, the bladder and urethra are separated from the rectum by the interposition of the vagina and uterus. As a result, while most of the genital fistulas are found in females, the rectovesical variety is only occasionally, and the rectourethral variety never, seen in this sex. As a general rule, the urinary fistulas are found in males and the genital fistulas are found in females. The urinary fistulas are classified as perineal, rectourethral, rectovesical, and rectourethral.

Perineal Fistula.—This fistula, whose origin is in the urinary tract, the result of diseases of Cowper's glands or the prostatic urethra, may present the appearance of an anorectal fistula, but it has no connection either with the anus or rectum. Although perineal fistula very properly belongs to the genitourinary surgeon, yet its origin should be recognized by the proctologist in order that no rectal surgery be attempted to effect its cure.

Rectourethral Fistula.—In rectourethral fistula the rectal opening is as a rule to be found above the external sphincter muscle, and the internal opening is in the majority, if not in all cases, to be found in the deep urethra. In some cases it may be difficult to say as to whether the fistula had its origin in the urethra or rectum. Among extrarectal causes traumatism may be considered an important factor. The intro-

⁸ The Proctologist, September, 1912, vol. vi, No. 3, p. 210.

duction of various instruments through the urethra, as in the performance of an internal urethrotomy or the divulsion of a stricture in the prostatic urethra, may produce a rent or false passage, or even perforate the rectal wall. If the urethral wall be punctured or torn, there will occur an extravasation of urine into the rectourethral septum. Abscess formation is the result, and this in many cases ruptures into the rectum. Calculi of the prostatic urethra or of the prostate gland itself may cut through the urethra, or by pressure may cause congestion, inflammation, ulceration, urine extravasation, and abscess formation with a resulting rectourethral fistula. It may also result from traumatism of the perineum and urethra in which extensive sloughs of the parts are present. Inflammatory disease of the prostate gland, whether simple, tubercular, or gonorrheal in character, cancer of the prostate, and prostatic abscess, may all result in the formation of a rectourethral fistula. In some cases it will be impossible to say whether the fistula originated in the rectum or in the urethra. The determination of the question as to whether the abscess opened into the urethra first and afterward invaded the rectum is not of so vital importance as keeping continually in mind the fact that extrarectal causes play a prominent part in the production of these fistulas.

Rectovesical Fistula.—As in rectourethral fistula, so in rectovesical fistula, the extrarectal causes may be practically the same. Inflammatory conditions of the prostate and bladder, the result of traumatism or disease, produce abscess formation between the rectum and the bladder, and the abscess ruptures first into the bladder and then into the rectum, or *vice versâ*. Extensive pelvic and periuterine inflammations, malignant disease of the bladder, stone in the bladder, etc., in fact, any condition which may produce inflammatory adhesions between the rectum and bladder, may result in the formation of a rectovesical fistula as the result of subsequent perforation. Although the prognosis in the case of a rectovesical fistula is always grave, it is well never to lose sight of the fact that it most frequently has its origin in extrarectal pathology.

Rectoureteral Fistula.—Except in malformations this type of fistula is exceedingly rare. In malignant disease of the bladder, where extirpation has been practised, one or both ureters have been transplanted into the rectum.

Rectogenital Fistula.—This variety of fistula is practically confined to the female sex, and may be divided into rectouterine, rectovulvar, and rectovaginal varieties.

The rectouterine fistula, usually due to congenital malformations, or where a malignant growth involves both the rectum and the uterus,

is of rare occurrence. Drs. James P. Tuttle⁹ and Thomas Cullen¹⁰ have each reported one such case.

The rectovulvar fistula is generally the result of traumatism, such as injuries during labor, efforts at repair of the perineum, violent coitus, and infection, with inflammation and suppuration, of the glands of Bartholin.

The rectovaginal fistula is due to a variety of causes and is the most frequent of all of the complicated fistulas. It may be the result of brutal and violent coitus, imperfect repair of the perineum, sloughing from any cause, such as prolonged pressure of the fetal head, submucous rupture of the rectovaginal septum during labor, etc. Pressure from too large or badly fitting pessaries, tumors of the perineum, dermoid cysts, carcinoma of the vagina, and large pelvirectal abscesses, the pus from which may burrow down between the layers of the septum and open both into the rectum and the vagina, may constitute the underlying pathology.

Although typhoid fever rarely affects the internal genitalia in women, Dr. H. J. Boldt¹¹ has observed and accurately reported a case of this type of tubal infection which opened into the rectum. Pyosalpinx of gonorrheal origin may open into the rectum, though it is of very rare occurrence.

Rectal Stricture.—In a case of rectal stricture, it is well to remember the relationship between pelvic, rectal, and perirectal inflammations. Infection of the broad ligaments (*postabortum* and *postparturient*) not infrequently extends to the perirectal connective tissue. This is at first infiltrated and becomes necrotic, and finally is transformed into an abscess, which should be drained as soon as it is recognized. After drainage of the abscess, there occurs a contraction of the connective tissue, forming a perirectal contraction. These cases are not easy to treat, as all the neighboring structures are involved and draw closely around the rectum. Dr. Howard Kelly¹² says: "After operation upon the broad ligament the periproctal tissue may be infiltrated with blood, giving rise to what is known as retrouterine or periproctal hematocele. After the absorption of the blood a stricture is usually produced which calls for some treatment."

The circular muscular fibers of the rectum are divided by bands of fibrous tissue. These fibrous bands run circularly around the rectum, and outward, anteriorly, they connect with the fibrous meshes of the pelvic tissue, the ligaments of the bladder, the broad ligaments of the uterus,

⁹ Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 446.

¹⁰ Carcinoma of the Uterus, p. 268.

¹¹ Gynecology and Abdominal Surgery (Kelly-Noble), 1910, p. 465.

¹² Gynecology and Abdominal Surgery, 1910, p. 466.

the prostate gland, and the fibrous sheaths of the levator ani muscle. Thus any inflammatory process which has its origin in these tissues may travel along the tract of these fibrous bands, involve or invade the rectal wall and result in a true submucous stricture. No previous solution of continuity or ulceration is essential for the production of such a stricture. Dr. James P. Tuttle¹³ says: "The fact that these circular bands of fibrous tissue enter into the conformation of the valves of Houston renders it easy of comprehension that contraction of these valves may result from perirectal inflammation without any involvement of the mucous membrane or surfaces of the valves themselves. The majority of cases in which the contraction of these valves has any influence in the production of constipation will be found in cases that have had pelvic, periuterine, or periprostatic inflammations."

Since rectal stricture is caused either by malignant growths or cicatricial deposits the result of previous inflammation, ulceration, etc., it is easy to understand the frequency with which its cause may be extrarectal in character. Displacements, enlargements and tumors of the uterus, tumors of the ovaries, tubes, broad ligaments, prostate gland, and other pelvic viscera, may cause obstruction in the rectum by pressure. Extrauterine pregnancy, or adhesive bands the result of local or general peritonitis, may narrow or completely occlude the lumen of the rectum. These are termed perirectal strictures; but if the exciting factor be continued sufficiently long it can and does produce true rectal stricture. Much of the success in the treatment of rectal stricture will necessarily depend upon the determination as to whether its cause is intra- or extra- rectal in character. In 1909, the writer¹⁴ presented to the American Proctologic Society the subject of cicatricial rectal stricture, basing his opinions upon the results secured in the treatment of 55 cases; 13 of the reported cases occurred in males and 42 in females. The probable exciting or primary cause of the strictures in these cases was given as follows: syphilis, 18; gonorrhea, 2; tuberculosis, 8; operation for internal piles, 9; injury during childbirth, 6; pressure from displaced uterus, 2; cause undetermined, 10. According to this report, in only 8 cases was the cause determined to be extrarectal, and yet the writer is now of the opinion that at least some of his failures from treatment can be attributed to the real causative factor of the stricture being unrecognized. This is probably true in some of the cases which occurred in females.

Hemorrhoids.—As extrarectal causes of hemorrhoids it is essential that the rectal specialist does not fail to recognize diseases of the

¹³ Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 460.

¹⁴ The Proctologist, September, 1909, vol. iii, No. 3, p. 102.

heart, liver, kidneys, lungs, atheroma of the vessels, etc. Valvular insufficiency of the right side of the heart through the backward pressure and the congestion which it produces in the liver, and the feeble cardiac action, induce hemorrhoids through the lack of force to drive the stagnating blood through the vessels. Congestion or cirrhosis of the liver by obstruction to the portal circulation, increasing backward pressure into the hemorrhoidal veins, will produce piles. While the explanation is by no means clear, certain diseases of the spinal cord, such as lateral and posterior sclerosis, appear to exert some causative

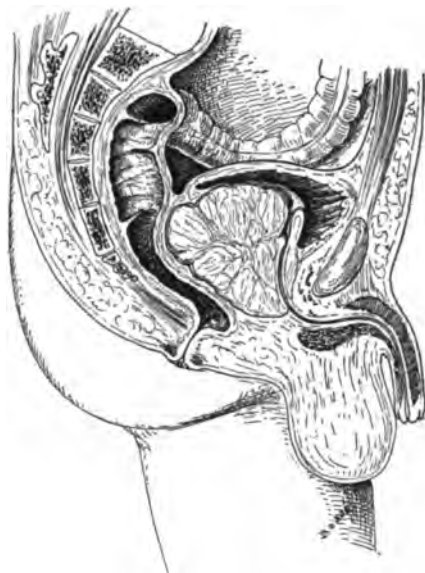


Fig. 173.—Enlarged prostate producing partial obstruction of the rectum.

influence in the production of hemorrhoids. Any inflammation of the urethra or bladder, or any tumor of the abdominal or pelvic viscera which induce undue straining or pressure upon the rectum, may be extrarectal causes in either producing or predisposing to the production of a varicose condition in the lower rectum. Dr. John B. Deaver¹⁵ says: "Enlargement of the prostate (Fig. 173), as is well known, is very apt to be accompanied by hemorrhoids and prolapsus ani. These may be produced by the prostatic hypertrophy, or they may be due to an independent though concurrent cause. Venous engorgement of the prostate and the vesical neck is one of the main causes of sudden urinary retention, and when such engorgement is prolonged or recurs

¹⁵ Enlargement of the Prostate, 1905, p. 82.

frequently, it leads to a varicose condition of the prostatic plexus. Under these conditions incompetency of the valves of the plexus develops, and the blood regurgitates through communicating branches, and becomes dammed up in the internal pudic and the middle and inferior hemorrhoidal veins. Since these all, as well as the prostatic plexus itself, empty into the internal iliac vein, no real relief to the venous obstruction ensues; but hemorrhoids develop. Not only does prostatic enlargement produce hemorrhoids, but it may seriously obstruct the rectal canal; obstipation is favored and this again reacts for evil by increasing the tendency to piles."

Prolapse of the rectum is liable to follow both from the straining in the efforts to empty the bladder and from the hemorrhoidal condition of the rectum itself. All conditions and diseases which produce straining at stool or in an effort to empty the bladder may therefore result in the production of hemorrhoids and prolapse of the rectum. That these extrarectal causes should be given serious consideration in the operative treatment is a question that is no longer open to argument. The operative technique for the removal of hemorrhoids is easy to master, but it is just as easy to overlook their real etiology. It would probably be somewhat startling to most of us if it were possible to secure reliable statistics as to the real causative factor of hemorrhoids. The writer would venture the opinion that if such information could be secured it would be found that in no small percentage of the cases the hemorrhoids were due to extrarectal causes. It is very true that radical surgery effects a cure, but this does not prove that the cause of hemorrhoids may not be frequently overlooked even by the proctologist. In the experience of the writer, some of the most aggravated cases, especially of internal hemorrhoids, were the result of pressure by a gravid uterus, and they disappeared, at least symptomatically, at the termination of the pregnancy. The same is true where they are associated with enlargements of the uterus from any cause, enlarged prostate, etc., and upon asking my colleagues why they did not operate for the hemorrhoids after removing the uterus, the prostate, etc., they have almost invariably informed me that the piles would care for themselves. From personal experience, unless the symptoms of hemorrhoids be prominent, these men have learned that the removal of the real cause will effect at least a symptomatic cure. This in itself should prove a most valuable lesson to the rectal specialist, and should stimulate him to increased efforts in an endeavor to determine the real cause of rectal pathology no matter what its nature may be. He should not be content to depend wholly upon surgical technique and operative skill, but should keep ever in mind the pos-

sibility of an existing rectal pathology being due to an extrarectal cause.

Malignant Neoplasms of the Rectum.—Cancer of the rectum may extend by continuity to the prostate, urethra, seminal vesicles, bladder, vagina, uterus, coccyx, etc., and, on the other hand, cancer of these various organs may extend to and invade the rectum. In not a few cases it is difficult to state whether the primary cause is intra- or extra-rectal.

Treatment.—Successful permanent results in the treatment of rectal pathology due to extrarectal causes are necessarily dependent upon the removal of the cause. As Dr. A. B. Cooke¹⁶ has said: "This opens up the much debated question as to how closely the specialist should restrict himself in his work." For example, shall the proctologist confine his work to the treatment of rectal pathology due only to intrarectal causes, or shall he undertake to treat all cases of rectal pathology and remove the cause if possible, no matter what its nature or where located? Shall he refer, for instance, his cases of rectal pathology due to a displaced or enlarged uterus, or to an enlarged prostate, to the gynecologist or the genitourinary surgeon for treatment, or shall he himself treat these cases? This is a question which each and every proctologist must decide for himself. If he considers himself competent to care for such cases, and desires to undertake the operative work which they demand, the writer can see no reason whatever why he should refer such work to his colleagues. It is impossible to formulate any rule for the guidance of the rectal specialist in deciding this question. He should know his own qualifications and capabilities, as well as his limitations, and he must decide for himself as to what extent his field of work is to be limited. Above all, however, he should be a conscientious surgeon; he should study his cases of rectal pathology as carefully as time will allow; he should not limit his investigations and examinations to the rectum itself; he should prepare himself so as to be competent to recognize pathology wherever it may be located, so that he may arrive at a diagnosis as nearly correct as possible. With such attainments as these the proctologist becomes at once a surgeon of broad gauge type. And such he should be, if he aspires to secure successful results in his chosen field of work. Diagnostic acumen, the finest perceptive powers, experience and the capacity for taking pains are qualities of the rectal surgeon which are not to be underestimated; yet they avail him nothing in the treatment of a rectal disease if he diagnoses correctly the pathology and fails to recognize an existing extrarectal cause.

¹⁶ The Proctologist, June, 1907, vol. i, No. 2, p. 37.

In presenting this chapter to the medical profession, the writer does so with the feeling that rectal pathology due to extrarectal causes has not received the recognition which it justly deserves. That extrarectal pathology plays a prominent rôle in the production of diseases of the rectum, and that the extrarectal pathology as the real causative factor is not infrequently overlooked, will be acknowledged by all proctologists of large experience. If this chapter does nothing more than stimulate the proctologists to increased efforts in an endeavor to ascertain the real cause of the pathology in every disease of the rectum, the writer shall have accomplished his purpose.

CHAPTER XXIII.

Local Anesthesia in Anorectal Surgery.

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MANY pathological conditions occur in the anorectal region which give rise to symptoms of pain or pronounced discomfort markedly disproportionate to the size and seriousness of the lesions which are found to be the causal factors.

It is the general consensus of opinion among rectal surgeons that in about 75 per cent. of these cases a minor operative procedure is all that is required to bring about relief and cure.

Since this can be accomplished most satisfactorily under local anesthesia it seems unnecessary to subject the patient to the dangers that lurk in a general anesthetic (even when given by an experienced anesthesiologist), or to those postoperative discomforts which frequently follow its administration.

The average layman has a dread for any operative procedure whatsoever under a general anesthetic, and from this there has resulted the birth and flourishing of the so-called "no-knife specialists," and others of their ilk.

On the other hand, most individuals have not that fear of cocaine, or novocaine, etc., that they have of chloroform or ether; so, when an operation under local anesthesia is suggested, they are apt to give their consent thereto far more willingly and readily.

With local anesthesia there is no danger to life if a weak solution of the anesthetic drug be used; there are no effects upon the heart, lungs, kidneys, or cord (as has been reported to follow the use of spinal anesthesia); urinary disturbances following operation are infrequent; the anesthetic solution, when combined with a solution of adrenalin chloride, makes the operation practically bloodless; certain minor operations may be done quickly, safely and effectively in the surgeon's office, as well as at the patient's residence, or at the hospital; the resisting power of the patient is not lowered (as it would be under a general anesthetic), and the process of healing seems to be much more rapid and satisfactory.

When the anesthetic solution is injected carefully and skillfully, and when sufficient time is allowed to elapse for analgesia to fully develop, there is very rarely any pain whatever during the operation, and, moreover, the postoperative pain is inconsiderable. But even should there be some little pain from insufficient anesthesia, patients bear it very well, being happy and contented in the knowledge that they are escaping the dreaded general anesthetic.

Unfortunately, the employment of local anesthesia in rectal surgery is too often taken to mean its use exclusively in office operations. This is not so. While it is true that there is a certain number of conditions which can be operated upon safely, easily, and quite effectively in the surgeon's office, yet experience teaches that it is only when the patient has the benefit of immediate quiet and rest for some days following the operation that the best results are obtained. Besides, there are some individuals who bear up quite bravely while they are being operated upon under local anesthesia, but as soon as the operation is completed, and the mental and physical strain is at an end, they relax, and very often become so faint that they are unable for a time to make their way homeward. Unless the surgeon is prepared to let his patient lie down for at least an hour after even a trivial operation, it is by far the best plan not to operate in the office.

If the surgeon is equipped to operate at the patient's home, and has proper assistance, most of the operations which can be performed under local anesthesia may be done there to very good advantage, especially so since the patient can be placed in bed as soon as the operation is completed.

But the best place to do this work is, if possible, in the well-equipped aseptic operating-room of a modern hospital. The surgeon then has at hand every facility for the best work; he conserves both his time and his energy, while his patient receives all that needed care which helps towards securing perfect results.

INDICATIONS.

Local anesthesia should be employed only on an individual of stable nervous organization. Its use is always to be considered when the patient is aged, or when the heart, lungs or kidneys are in such a state as to raise a question as to the wisdom of resorting to general narcosis.

There are quite a number of anorectal affections which may be operated on under local anesthesia. These comprise internal hemorrhoids (in selected cases); fissures of the anus; small, simple, straight fistulæ, uncomplicated by other serious disease; external thrombotic

hemorrhoids; cutaneous hemorrhoids; hypertrophied papillæ; small anal strictures; inflamed crypts of Morgagni; polypi; ulcers; moderate degrees of prolapse; dermoid cysts; sebaceous cysts; lipomata; condylomata; small benign growths situated at or near the anal orifice, and marginal abscesses. These are the lesions met with most frequently in the practice of the proctologist, and when they are operated upon under a local anesthetic, skillfully and painlessly administered, an unwilling and resisting patient is changed into an enthusiastic, grateful, and delighted admirer of the marvels that may be accomplished with this great gift to modern surgery.

Dr. Lewis H. Alder, of Philadelphia, has suggested that the anorectal diseases which may be treated under local anesthesia should be subdivided and considered under the two classifications of (1) those admitting of office treatment, and (2) those requiring treatment at home or in a hospital. Under (1) those admitting of office treatment, he includes external hemorrhoids, both thrombotic and cutaneous, or other excrescences about the anal region; fissures of the anus; and abscesses, of not too large an extent. A very small proportion of fistulæ may be fairly satisfactorily operated on in the office, but it should be remembered that even an apparently trivial fistula may have diverticulæ which are not readily discoverable except when the patient is under the influence of a general anesthetic, and which, if not well eradicated, will invariably cause a return of the trouble. Under (2) those affections admitting of operative treatment under local anesthesia, but requiring the operation to be performed at home or in a hospital, what may be done depends somewhat upon the nature of the case, and a great deal more upon the skill and courage of the operator.

CONTRAINDICATIONS.

Local anesthesia should not be used on children, on those who behave like children, or on very nervous individuals.

There are numerous important conditions in which the use of local anesthesia is contraindicated. A general anesthetic should be the sole method of choice when operating on complex, horseshoe, rectovesical, rectovaginal, or rectourethral fistulæ; or on a simple fistula when it is not absolutely certain that it is straight, uncomplicated, and of not too extended length. It should be used also for the removal of neoplasms requiring extensive dissection; for all resections and excisions; for strictures and malformations above the anal canal; for conditions situated high up in the rectum; for small contracted anus; for marked prolapse; and for extensive or complicated internal hemorrhoids.

A local anesthetic is especially contraindicated when there is any uncertainty as to the exactness of the diagnosis, or when doubt exists as to just how extensive an operation possibly might be necessary.

While incipient, small ischiorectal abscesses may be opened under local anesthesia, a resort to general narcosis is preferable if the abscess has attained any considerable size, for a much more extensive operative procedure may have to be done than was at first anticipated before the primary focus of infection is reached.

ANESTHETIC DRUGS.

Following the introduction of cocaine as a local anesthetic strong solutions of the drug were used at first in anorectal operations. This was followed often by most alarming symptoms, and even by fatal results, both of which were due to the rapid absorption of a toxic quantity of the drug into the general systemic circulation.

With the introduction of less toxic drugs for the production of analgesia, the use of much weaker solutions, and through the persistent efforts of such well known proctologists as J. R. Pennington, of Chicago; Samuel G. Gant and J. P. Tuttle, of New York City; Louis J. Hirschman, of Detroit; Thos. C. Martin, of Washington; and A. B. Cooke, of Nashville; all of whom have devoted much time and energy to the subject of the use of local anesthetics in anorectal surgery, the objections urged against the method were dissipated, and it has gradually come more and more into general use and favor.

It is to Dr. S. G. Gant, in particular, that proctologists, and the profession at large, are indebted for the impetus given to the employment of local anesthesia in anorectal surgery. He at first used very weak solutions of the drugs with anesthetic properties, and subsequently, having observed that the anesthesia appeared to be the result, to a great degree, of the mechanical pressure of the solution upon the nerve endings caused by distention of the tissues through the overly large quantity injected, he was the first to suggest the use of plain sterile water and normal saline solution as local anesthetics. His success in this field inspired many others throughout the country to employ the method.

As before stated, in order to secure complete anesthesia with plain sterile water or normal saline solution, it is necessary to inject a large amount in order to get the effect of pressure on the nerve endings. This, unfortunately, causes distortion of the tissues and obscures the relations of the parts in the operative field, consequently adding to the difficulties of the operation.

Since weak solutions of most of the analgesia-producing drugs are practically harmless, and as they offer a far more satisfactory anesthesia than plain sterile water or normal salt solution, without possessing the disadvantages of both of the latter, their use is always preferable. It is well to remember, however, that in an emergency, when an anesthetic drug cannot be procured readily, plain water is always at hand, and when sterilized will answer very well the purpose for which it is required, although from its not being isotonic with the interstitial fluids of the body it is rather irritating and painful when injected into the tissues.

Cocaine Hydrochloride is the most extensively used preparation of cocaine. In operations in and about the anorectal region it is generally made use of in solutions of the strength of $\frac{1}{10}$ of 1 per cent. to 1 per cent. The stronger solutions are employed if the part is exceedingly sensitive or if the amount to be injected is only very small; the weaker solutions when the tissues are to be infiltrated with larger quantities of the fluid.

Solutions containing this drug should be prepared freshly each time. Cold sterile water should be used, as cocaine hydrochloride is readily decomposed on boiling. Moreover, a fungus rapidly develops in a solution of this drug if left standing, and it becomes potentially septic in a few hours, and in a few days is distinctly so, and is then capable of producing suppuration. According to Dr. Lewis H. Adler, when the solution is made up in distilled water, to which 2 per cent. of boracic acid has been added, it will keep indefinitely, and it will be unnecessary to sterilize the solution every time it is needed.

Cocaine and its congeners produce their local effects on the normal mucous membrane of the anus and rectum for but a short time and are then rapidly absorbed. This produces, at times, most alarming systemic action, and consequently great care must be taken in their employment. If too much of the stronger of the solutions recommended is injected it will be observed that the patient becomes quite talkative; while the injection of a 4 per cent. solution, or even less, may cause marked cyanosis and pronounced evidence of shock,—feeble pulse, rapid and shallow breathing, and very moist skin; and even death may follow.

An important means of delaying this systemic absorption is found in the action of **adrenalin**. This is the astringent, blood-pressure-raising principle of the adrenal or suprarenal glands. It produces a local vasoconstriction, thereby preventing diffusion and rapid general absorption into the circulation. It also stops, temporarily, excessive bleeding and so gives a clearer field for the operator to work in.

The preparation most commonly used is the 1:1000 adrenalin chloride solution, containing 1 part of adrenalin chloride in 1000 parts of normal salt solution, with 0.5 per cent. chloretone. The addition of 5 minims of this 1:1000 adrenalin chloride solution to the ounce of sterile normal salt solution is readily and quickly accomplished. This makes a solution with the strength of 1:100,000, as recommended by Barker.

A solution made up freshly is always to be preferred, as there is difficulty in preventing the decomposition of the adrenalin when it is mixed with other solutions or exposed to the light.

The anesthetic drug is added to this solution in an amount sufficient to make up the desired strength.

When combined with adrenalin the action of cocaine and allied drugs is said to be enhanced two to tenfold, very weak solutions with it in combination having the same anesthetic effect as strong solutions without it. Hence a much less quantity of the toxic drug is required to secure effective local anesthesia, with a consequent lessening of all attendant dangers.

Care must be taken, however, when adrenalin is used in combination to avoid the occurrence of secondary hemorrhage. The adrenalin causes a marked contraction of the blood-vessels by direct action on their contractile tissues. Even when a solution of this drug in the strength of only 1:1,000,000 is injected subcutaneously the tissues become quite bloodless; and with a still stronger solution arteries and veins of even medium size scarcely bleed when cut through. These may escape the notice of the surgeon, and, if not ligated, will naturally bleed later. It is therefore best to use a solution which is just sufficiently strong to act only on the smaller arteries and capillaries. Then any hemorrhage from a larger vessel may be detected and stopped at the time of operation.

For small operative procedures, where secondary hemorrhage could be easily noticed and controlled the writer employs a 1:10,000 solution of adrenalin. This gives an almost bloodless field when the tissues are cut, and greatly aids the operator.

Novocaine.—Since the introduction of cocaine many substitutes have been recommended, so that the anesthetic drug which is used has become now merely a matter of individual choice. The writer has a decided preference for novocaine. This preference is based upon the studies embraced in a report made by Le Brocq, from the Pharmacological Laboratory of Cambridge University, England, to the Therapeutic Committee of the British Medical Association. After a careful investigation of all the local anesthetics recommended as substitutes

for cocaine, such as alypin, nirvanin, stovaine, tropacocaine, novocaine, betaeucaine lactate, etc., he arrived at the conclusion that novocaine is the most satisfactory of them all for general use in local anesthesia. His reasons are that (1) the anesthetic action of novocaine is equal to that of cocaine, and its toxicity and general destructive power on the tissues is very much less; (2) it causes no swelling and hyperemia; (3) the parts remain normal after injection; (4) it is compatible with adrenalin; (5) it is freely soluble in water; (6) it can be sterilized and undergo no change.

These are the essential qualifications of a good local anesthetic. In addition to these qualities novocaine solution diffuses readily, and acts as quickly as cocaine solution, anesthesia being satisfactory in a few moments after the injection is completed, while its duration is always more than an hour, and often as long as three to four hours. After the anesthetic effect has passed off there is often, the same as with other drugs, a variable degree of burning and smarting pain left in the wound. Sloughing of the skin which occasionally follows the use of other anesthetic drugs does not follow the employment of novocaine.

The writer employs novocaine in solutions of 1 per cent. strength for anesthetizing the sphincters and the skin, and in a strength of $\frac{1}{10}$ of 1 per cent. to $\frac{1}{2}$ of 1 per cent. for infiltrating tissues. The strength of the solution used depends upon the sensitiveness of the tissues to be anesthetized, and also upon the quantity necessary to be injected. With this the adrenalin solution is mixed in an adequate proportion.

Quinine and Urea Hydrochloride has come extensively into use in late years as a non-toxic substitute for cocaine. Dr. Louis J. Hirschman, of Detroit, Mich., has used this drug to a considerable extent as a local anesthetic in his anorectal operations, and in a paper read before the American Proctologic Society in 1910 gave a summary of his reasons for considering that it has very decided advantages over other local anesthetic drugs. They are as follows: (1) it is freely soluble in water; (2) it can be sterilized; (3) it is equal to cocaine in anesthetic power; (4) it is absolutely non-toxic; (5) it has a pronounced hemostatic action; (6) after its use postoperative anesthesia lasts from four hours to several days; (7) it is inexpensive and generally available.

When used in the strength of $\frac{1}{2}$ of 1 per cent. to 1 per cent. solution it produces immediate and complete anesthesia lasting for seven to ten days. But in this strength it produces an induration and thickening of the edges of the wound due to a fibrous exudate. This results in delayed skin union. Therefore, it should be used in this strength

only in regions where primary union is not necessary; where no suturing is to be done; or in tissues which are the seat of inflammatory reaction, as in abscesses, inflamed hemorrhoids, etc.

A $\frac{1}{4}$ of 1 per cent. solution is the best strength to employ for ordinary operative procedures. Anesthesia becomes complete after a few moments, and lasts for several hours; no induration is produced; and primary union speedily takes place. A 10 to 20 per cent. solution may be used for local application to mucous surfaces.

The use of a stock bottle of a solution of any of these anesthetic drugs is hardly necessary in these modern days when other far more convenient and much safer containers are readily secured from enterprising pharmacists and pharmaceutical houses at very moderate prices. Hermetically sealed and perfectly sterilized glass ampules, containing 1 to $1\frac{1}{2}$ c.c. of a solution of the various anesthetic drugs, prepared in different strengths, with or without the addition of adrenalin chloride, have been placed on the market, and their use affords a sense of security as regards the prophylaxis of sepsis that is most comfortable. Should weaker solutions be required the contents of the ampule, or only a portion of it, may be drawn up into the syringe and plain sterile water, or normal saline solution added until the desired strength is obtained. The dry drug is also put up in these sterilized ampules, and it may be used to prepare freshly larger quantities of a still weaker solution for infiltration purposes.

The external surface of these ampules can be sterilized by placing them in a 1:500 bichloride solution for fifteen minutes before the time they are needed for the operation. Just before they are opened they should be rinsed off with plain sterile water in order to avoid clouding of the contents from admixture with the bichloride.

Ethyl Chloride.—The ethyl chloride spray has a very limited field as a local anesthetic in anorectal surgery. The pain caused by the freezing of the tissues is always more bitterly complained of than is that resulting from such a simple procedure as snipping off small condylomata and cutaneous tags, or incising a small abscess formation.

Syringes.—No special type of syringe is an essential requirement for this work. Any all metal or all glass syringe which can be thoroughly sterilized is capable of doing everything claimed for the special syringes used by some operators. The best syringe is one constructed entirely of glass. The regular glass antitoxin syringe, with a barrel capacity of 10 c.c. does excellently. This has an asbestos wrapped plunger, a glass screw connection for the needle, and rubber washers, all of which permit of thorough sterilization. It rarely requires refilling for any of the smaller operative procedures.

The Luer all-glass syringe, with a tip on to which the needle is easily slipped, is an excellent type, but has the one disadvantage that, when pressure is exerted at the time the injection is being forced into dense tissues, the barrel is apt to be thrown back out of the shank of the needle, and its contents are thereby lost.

Handle bars should be fitted to the syringe, so that one hand only need be used for injecting. This also permits of more steady pressure being made on the piston.

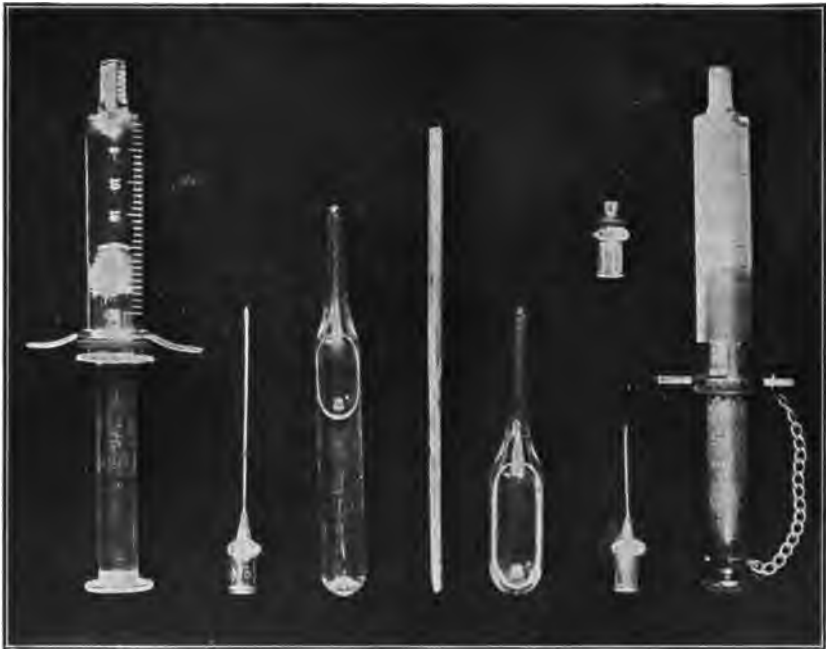


Fig. 174.—From left to right: All-glass syringe, with glass screw-tip for needle; 2-inch platinum-iridium needle; $1\frac{1}{2}$ c.c. ampoule of anesthetizing solution; fine file for breaking ampoules; 1 c.c. ampoule; (lower) 1-inch platinum-iridium needle; (upper) adaptor for use of other style needles; all-glass syringe, with glass slip-tip for needle.

The use of an ordinary hypodermic syringe with leather washers is only mentioned to be condemned. As anorectal operations are rarely, if ever, necessary to be done hurriedly in emergency, the operator has plenty of time to provide himself with a proper armamentarium.

A very good though not an essential addition to the syringe is a curved metal extension needle piece. When this is made use of it allows an unobstructed view of the operative field during the injection. It is

also of much practical utility when tissues higher up in the bowel must be infiltrated through a proctoscope.

Both the syringe and the needles must be sterilized thoroughly just before being used.

Needles.—Much of the success in local anesthesia with reference to giving the patient a minimum of pain depends upon the needle which is used. It should be of the highest quality obtainable and should possess a fine, well-sharpened point. This will give, when introduced with a quick stab into the skin, the least amount of pain.

As frequent boiling tends to erode the unplated lumen of a needle and dulls its point, it is advisable to use a perfectly new one for each operation. Platinum-iridium needles, though considerably more expensive than the ordinary steel needles, are the best type now available in the market. They are not corroded by the drugs employed, nor is their lumen eroded by repeated boiling.

Where it is not necessary to inject very deeply, or into dense tissues, a three-quarters or one inch fine gauge needle will be found to answer the purpose admirably.

For local anesthetization of the sphincters a stronger and longer needle is necessary. The needle ordinarily used for intramuscular injections will answer, although usually of rather large caliber. To obviate unnecessary pain the primary puncture into the skin may be done with a very fine needle; then, when a small area is anesthetized the larger needle may be introduced at that point.

It is a good plan to always have an extra syringe and needles prepared and sterilized ready for use before the operation is begun. This will sometimes prevent delay and annoyance, arising from accident, at a time when speed means success.

Posture.—An advantage of local over general anesthesia in anorectal operations is that when the former is employed the patient can be placed in positions that are hardly practicable with the latter. At times, in certain selected cases, the knee-chest or knee-elbow position, or the Hanes position, in which the patient is completely inverted, will be found particularly serviceable to the operator, bringing, as they do, the operative field so well into view and making it so easily accessible.

Most of the anorectal operations under local anesthesia can be performed with the patient in the left lateral position (with the left leg fully extended and the right well flexed), or in the dorsal lithotomy position.

When the semiprone position is assumed it should be remembered that during the operation blood and blood-tinged fluids may drain back into and collect in the rectal ampulla. This might cause some

anxiety to the operator by giving the impression that considerable oozing is still going on after the operation was thought to be completed.

Technique.—Before operating under local anesthesia the patient should be prepared as thoroughly and carefully as when the operation is to be performed under a general anesthetic.

Operations in the office should be done only with the greatest surgical cleanliness.

If an operation must be done before time can be taken to properly clean out the patient's bowel, an enema of a pint of cold water, with or without the addition of glycerine, will quickly empty the lower bowel in a fairly satisfactory manner.

When the operation allows time to be taken for proper preparation of the patient, an ounce and a half or two ounces of castor oil should be administered early on the evening preceding the morning of the operation. Six hours before the time set for the operation a high enema of castile soap suds should be given, to be followed by a low enema of a pint of cool boric-acid solution an hour before the operation is to begin.

If this procedure is properly carried out there will be little occasion to fear a movement of the bowels either during the operation or for several days thereafter, and the internal use of any preparation of opium may be dispensed with.

An agreeable method of giving castor oil is to add the required amount to the sweetened juice of an orange and stir up thoroughly. Then add a good pinch of sodium bicarbonate and again agitate the mixture. This produces an effervescent beverage in which the disagreeable taste of the oil is pleasantly disguised, and it is acceptable to even a sensitive stomach.

About twenty minutes before the patient is brought into the operating-room he is given a hypodermic injection of $\frac{1}{4}$ grain of morphine together with $\frac{1}{150}$ grain of atropine. This tends to quiet that nervous dread which most patients have for an operation. It is hardly necessary to give this preliminary to any of the very minor operations under local anesthesia which can be performed in the surgeon's office.

After the patient has been placed on the table in proper position the external parts about the anus should be cleansed thoroughly with green soap and warm water, bidding the patient to bear down as if the bowels were about to move, so as to evert the anal mucous membrane and thus permit of its also being well cleansed. This should be followed by free application of plain sterile water, and this in turn by a 1:2000 solution of bichloride of mercury.

Wherever it will not cause too much burning and smarting the

tissues may be painted with tincture of iodine, which is a most excellent and effective antiseptic. This should not be applied, however, when bichloride has been used just preceding it, for fear of producing an irritating iodide of mercury.

When the operative field is above the external sphincters the latter are injected, anesthetized, and then dilated. After they are dilated the rectum and anal canal are flushed out with a saturated solution of boric acid, and then swabbed until dry and clean. Following this the external parts are again washed off with a 1:2000 bichloride solution.

Mr. J. Lockhart Mummery, of London, England, uses a 1 in 20 carbolic acid solution, and believes it to be particularly valuable in preventing sepsis in and about the anorectal region.

Anesthetization of the Sphincters.—In 1905 Dr. Jas. P. Tuttle, of New York, first demonstrated the possibility of painlessly dilating the sphincters of the anus through the injection of a local anesthetic with a single puncture of the needle. Réclus, of Paris; Bodine, of New York, and Martin, of Washington, had attempted previously to painlessly dilate the sphincters by injecting a solution of an anesthetic drug into various parts of the sphincter muscles; but they met with only indifferent success.

Tuttle employed a hypodermic needle about two inches in length; and a sterile, freshly prepared solution of cocaine of the strength of $\frac{1}{2}$ of 1 per cent. A 1 per cent. novocaine solution answers the same purpose. The needle is introduced in the median line about one-half inch back of the posterior commissure of the anus, and a drop or two of the solution is injected into the subcutaneous tissue. Care must be exercised at this point not to inject the solution too quickly, or in too large an amount, as it will cause the patient needless pain. The index finger of one hand, covered by a thin rubber finger cot, and well lubricated, is then introduced into the rectum and hooked around the internal sphincter, which is pulled downward and backward, dragging it into close apposition with the external muscle. Then the needle is pushed upward and forward along one side into the sphincters, one after the other in turn, depositing about five minims or so of the solution in each muscle. Care should be taken while doing this that the needle is kept always about half an inch from the anal walls.

The needle is retracted then to the point of entrance and almost but not entirely withdrawn, and the same procedure is repeated upon the opposite side. About twenty to thirty minims of the solution are used in all.

After the solution is injected, wait three or four minutes for complete anesthesia to take effect. Then an Earle single duck-bill speculum, with

the index finger used as an obturator, is introduced into the anterior commissure of the rectum, and with this as a point of resistance the sphincters are gently massaged, and soon can be stretched to the desired extent. Hirschman uses a cone-shaped rectal calibrator, attached to the handle of a rapidly acting vibrator, to accomplish dilatation of the sphincters after local anesthetization.

It is not claimed for this method that the sphincters can be divulsed, or that the perirectal tissues can be torn down without pain, but it does permit of the sphincters being stretched sufficiently for all practical purposes of operating under local anesthesia.

The explanation of this anesthesia following injection of the sphincters lies in the fact that the inferior hemorrhoidal nerve and the lesser sphincterian nerve of Morestin are distributed in these muscles.

Thrombotic External Hemorrhoids.—These can be operated upon easily in the surgeon's office, and do not require a preliminary dilatation of the sphincters. As they generally have a sudden onset and are quite painful, this type of hemorrhoids comes to the surgeon practically as an emergency operation; so there is no time for a routine preparation of the patient's bowels. If they have not moved well on that day, a low enema of a pint of cold water is administered, with the patient lying on the side. This will secure, as a general rule, a good emptying of the lower bowel. The external parts and the anal canal are then washed off and prepared according to the technique previously outlined. A $\frac{1}{4}$ of 1 per cent. solution of either cocaine or novocaine, together with 1:10,000 adrenalin is injected just beneath the fine overlying skin, in a line for an incision radiating from the anus. Sufficient solution should be injected to cause a fair amount of distention, while the needle should be carried up well to the edges of the tumor. After a delay of a few moments, an incision is made with a curved bistoury, starting well within the anus and cutting outward. The clot is everted, precaution being taken to see that none is left behind. Any redundant skin should be removed at the same time. The cavity is then packed with a very narrow gauze strip to prevent refilling, and an external dressing applied.

Cutaneous Hemorrhoids.—After the parts are properly prepared for operation, the base of the hemorrhoid is injected with $\frac{1}{2}$ per cent solution of novocaine in combination with 1:10,000 adrenalin chloride. After waiting a few moments for the anesthesia to become complete the hemorrhoid should be cut off, and the resultant wound allowed to heal by granulation. The wound may be closed with sutures, but this is apt to be followed by infection in this region.

Fissure of the Anus.—This very common and most painful and annoying affection is quickly, and most effectively, relieved under a local

anesthetic. While this can be done in the surgeon's office, yet it is advisable that the operation take place in the patient's home, or better still in the hospital, so that immediate rest in bed may follow, and thus the best results be secured.

The great majority of fissures of the anus are in the posterior commissure. Either incision or excision of the fissure may be performed. The writer prefers the former, and has a decided preference for Gant's



Fig. 175.—Injection of a local anesthetic preliminary to operating on a fissure of the anterior commissure of the anus (a common condition in women). With the patient in the knee-elbow position the parts are made more accessible.

technique for the same, and has found it to give every desired result. This can be done without preliminary dilatation of the sphincters.

For the local anesthetization of the parts the needle is inserted through the skin about half an inch below the posterior commissure of the anus, and a few drops of a $\frac{1}{2}$ of 1 per cent. solution of novocaine, with adrenalin, are injected slowly. Then it is carried upward and backward until the tissues underneath the whole extent of the fissure are well infiltrated. After waiting a few moments the blunt blade of a pair of probe-pointed scissors is inserted into the anal canal, while at

the same time the sharp-pointed blade is pushed upward through the tissues for about an inch, starting from where the needle was first inserted. The external sphincter muscle is then cut between the blades. This leaves a trough-shaped wound, with its deepest and widest part at the external border of the anus. The nature of this wound is such that it will allow of perfect drainage and for healing to take place from above downward. With the use of a 1:10,000 adrenalin solution there is



Fig. 176.—Technique for injecting a local anesthetic before operating on hypertrophied papillæ of the anal canal. The patient is placed in the knee-elbow position.

scarcely any bleeding. The wound is packed with gauze for twenty-four hours, and subsequently treated like a fistula wound.

Often there will be found a so-called sentinel pile at the lower angle of the fissure, and sometimes a polypus at the upper angle. These should be anesthetized and removed at the same time.

If excision of the fissure is the method of choice, the sphincters are first dilated after local anesthetization. Then the base of the fissure should be infiltrated sufficiently with a $\frac{1}{10}$ of 1 per cent. novocaine solution, so as to raise it, as it has been described, on a water-bed. After this has been accomplished the fissure may be readily and painlessly

excised. The wound that remains is either closed by suture or left to heal by granulation.

The best results are secured when the sphincter is divided. It may be incised in the posterior median line; on either side; or on both sides, making a double or inverted V-shaped cut.

Hypertrophied Papillæ.—These little growths may be excised through a short anoscope without the necessity of a preliminary dilatation of the sphincters. An extension needle piece is attached to the syringe, and the base of each papilla is injected with a $\frac{1}{4}$ or a $\frac{1}{2}$ per cent. solution of novocaine solution, combined with adrenalin, 1:10,000. There is rarely any bleeding of consequence after they are cut off, and the wounds generally heal quite rapidly.

Polypus.—In the majority of instances it is necessary to anesthetize and dilate the sphincters in order to bring the growth well within reach. The base of the polypus, and then the body, are respectively injected with a $\frac{1}{4}$ or a $\frac{1}{2}$ of 1 per cent. solution of novocaine, with 1:10,000 adrenalin chloride in combination. When anesthesia is complete the tumor is ligated, then cut off.

Should the polypus arise from an internal hemorrhoid, as is quite common, the pile should be injected with a $\frac{1}{10}$ of 1 per cent. solution of novocaine and removed according to the technique given under the heading of "Internal Hemorrhoids."

Internal Hemorrhoids.—Excision, clamp and cautery, and ligature are the three surgical procedures that are generally undertaken when operating upon internal hemorrhoids. Of these the ligature operation is the only one that should be done when local anesthesia is the method of choice. Moreover, except in carefully selected cases, even the ligature operation should not be done in the office, but always in the patient's home, or best of all, in a hospital.

When the hemorrhoids are well prolapsed and can be readily returned, it is quite unnecessary to dilate the sphincters, but when these muscles are tightly contracted they must be anesthetized and dilated so that the tumors can be readily pulled down.

Each tumor is injected in turn with an amount of a $\frac{1}{10}$ of 1 per cent. solution of novocaine which is sufficient to distend it so that it turns whitish in color. This blanching of the tissues denotes that anesthesia is complete. The base of the pile is then cut away with scalpel or scissors at the mucocutaneous border, and the tumor dissected up until there is left only a pedicle in which are contained the blood-vessels. A fine, strong, linen thread is then tied carefully and tightly about the pedicle, and the tumor cut away above the ligature.

After all the hemorrhoids have been attended to the stumps are

anointed with a soothing ointment, and pushed up gently above the sphincter. An excellent emollient preparation for this purpose is one recommended by Tuttle:—

℞ Ichthyol	25 grains.
Argyrol	50 grains.
Anesthesin	75 grains.
Petrolatum alba	½ ounce.
Ung. zinci oxidi benzoinat	q. s. ad 1 ounce.

This ointment should be dispensed in a collapsible, rectal tipped tube, and when applied to the wounds several times a day will go far to ease any postoperative pain.

Marginal Abscess.—Owing to the inflammation and extreme tenderness which attends abscess formation a stronger solution is required to secure good local anesthesia than when a healthy surface is to be incised. A 4 per cent. solution of novocaine is generally employed. A long fine needle is inserted obliquely, or almost parallel with the surface, between the layers of the skin, and a small drop of the anesthetic solution is forced just beneath the epidermis. The injection should commence just beyond the zone of increased tenderness, and be gradually advanced toward the more tender area, without removing the point of the needle from beneath the epidermis. The solution should be injected drop by drop as the needle progresses. When it has been passed its full length it is withdrawn, and the point inserted again into the most advanced area which has been already anesthetized. The complete line of the intended incision is thus rendered anesthetic, and if care be taken that the solution is injected only between the layers of the skin, anesthesia will be secured effectively with a minimum amount of absorption into the general circulation.

Fistula.—As has been stated previously, it is best to operate on all fistulæ under a general anesthetic, because it is exceedingly difficult to determine accurately beforehand that even an apparently simple straight sinus has no diverticula.

An internal, blind, submucous fistula, which extends from its internal opening at a crypt of Morgagni to the anal border, is easily and successfully incised under local anesthesia after it has been hooked up by a fine probe, the end of which has been bent upon itself.

A small, straight, uncomplicated fissure, of limited extent, can be operated upon under local anesthesia after the sphincters have been anesthetized locally, and dilated. The skin overlying the fistulous tract should be injected with 1 per cent. solution of novocaine, and the underlying and surrounding tissues infiltrated with a ¼ of 1 per cent. solution. Incision or excision of the fistula may then be done.

GENERAL REMARKS.

The primary essential for the successful employment of local anesthesia in anorectal surgery is that a careful and correct diagnosis be made before the operation is commenced.

Under this method of anesthesia speed in operating is necessarily of considerable importance, for the period of analgesia is limited. The operator, therefore, must know exactly beforehand just what is necessary to be done; he must be sure that it is all that should be done; he must know just how it should be done; and, finally, he must be prepared to do it with neatness and despatch.

As the tissues in and about the anal canal are exquisitely sensitive, the utmost gentleness must be exercised in their manipulation. Perfection of technique, which comes only from long practice and experience, should be the aim of the operator.

A patient with a rectal affection which troubles him sufficiently to urge him to seek relief through an operative measure is generally an individual whose nerve force has been drawn upon far too much by the exactions of his affliction. It is necessary, therefore, that the operator shall endeavor to secure his confidence by impressing upon him, in an earnest and convincing manner, that there will be very little, if any, pain besides that caused by the first prick of the needle. When this assurance has been given, the operator must try to make good his word.

During an operation under local anesthesia a patient generally labors under considerable physical and mental strain; is under high nervous tension; is keenly alert, and every sound and word has for him an especial significance. Therefore the less noise made in handling instruments, and the more perfect silence the better.

A well-trained assistant who can understand the operator's requirements by a look, instead of a word, is a most valuable asset.

An occasional cheery word from the operator, telling the patient that all is going well, and that it will soon be over, will help toward restoring the patient's ebbing courage, and goes far toward preventing possible shock.

CHAPTER XXIV.

Injuries and Rupture of the Rectum and of the Sigmoid Flexure.

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WOUNDS AND INJURIES.

NATURE has so well protected the anus and the rectum in the bony framework of the pelvis that injury of the organ through external causes ought rarely to occur. In the upright position, the rectum is guarded in front by the symphysis pubis, posteriorly by the sacrum and coccyx, laterally by the iliac bones with their tuberosities. It is only from below that the organ can be injured. Even here, in the upright position, the parts are protected by the thighs.

In order to inflict any injury to the rectum from below the force must be applied while the thighs are out of the way. This can only occur when the lower limbs are flexed. The individual must necessarily be stooping forward or be in a squatting position.

Notwithstanding the protected location of the rectum, wounds of this organ are frequently encountered. These may be arranged into contused, lacerated, incised and punctured wounds.

Contusions may be caused by falls upon the buttocks; by long continued pressure, as that resulting from the passage of the head in childbirth; by the prolonged pressure of foreign bodies in the rectum; or by forcible dilatation of the sphincter ani muscle.

Lacerations may follow the overstretching of the anal canal in manual dilatation of the muscle; the introduction of large foreign bodies into the rectum; the expulsion of large fecal concretion; the passage of sharp foreign bodies in the stool; falling upon rough bodies like that of the root of a tree, or the descent of the head in childbirth.

A. B. Cooke¹ reports a unique case of laceration and rupture of

¹ Proctologist, vol. iv, p. 189.

the sphincter ani muscle: "About noon a little fellow aged 7 years, who lived on a farm, went out to his favorite place behind the corncrib to attend to a call of nature. While engaged in the act a pet dog, a hound of medium size, came up from the rear and mounting him effected entrance into the anus and became 'accoupled.' The child's outcries quickly brought his mother upon the scene. The dog had reversed his position and was in the same relation to the boy as is ordinarily seen following sexual intercourse with a bitch. The mother's excitement was naturally very great and in her frantic efforts to disentangle the two she used considerable violence, first with her hands, finally jerking the dog loose by main strength. When the physician arrived the hemorrhage had practically ceased, but upon inspection, he discovered that the bowel was lacerated and advised that the boy be taken to Nashville for treatment." On examination, "there was no bruising of the surrounding parts and little external evidence of injury. Traction upon the anus, however, revealed that several lacerations of considerable extent were present." The external sphincter muscle was torn in several places. After remaining in the hospital about two weeks, he left with perfect control of the bowels.

Ashton² treated a woman who received a kick from a cow she was milking; a lacerated wound was produced, extending through the labium of the right side across the perineum to the rectum.

Laceration with retraction of the rectum frequently occurs when the trunk of the patient is crushed between two opposing forces.

P. R. Griffiths³ mentions the case of a miner aged 35 years, who had been jammed between a wire rope and a post on which there was a knob. He thinks that the knob must have been pressed into his perineum. On admission to the hospital the perineum presented a curious picture. The anus was absent, but in its place was a ragged opening about one and a half inches in diameter. The anal canal had retracted about one inch or more into the wound, being connected to the skin by means of a narrow shred of tissue. The pelvis was fractured at a point a little to the left of the symphysis pubis. The urethral canal was torn. The retracted anal canal was stitched into its normal position; a catheter was introduced and retained in the bladder. Patient made a fine recovery.

J. S. Martin⁴ reports a similar case occurring in a miner aged 30 years, who while working in a pit jumped in front of a moving wagon,

² *Diseases of the Rectum and the Anus*, p. 238.

³ *British Medical Journal*, London, 1907, vol. ii, p. 21.

⁴ *British Medical Journal*, 1907, vol. i, p. 1424.

which knocked him down and pushed him before it. The rectum was completely separated from the anus and was drawn up into the top of the wound. The external sphincter as well as the levator ani was torn. The internal sphincter was intact. The rectum was brought down and sewed to the anus. Complete recovery.

P. Harrass⁵ reports 2 cases. A man aged 44 years gave the history of falling upon the buttocks when a wooden bridge collapsed and fell upon him. The pelvis was flattened laterally. The rectum with the external sphincter was torn in a circular manner completely from the skin of the anal region. It had retracted about 15 cm. from the normal position, was isolated and resembled the stump of the gut after extirpation of the rectum. Blood still continued to flow from the wound. Patient failed to rally and died in a few hours. Autopsy showed that the bladder and the urethra were intact, the scrotum swollen and discolored, the pelvic connective tissue infiltrated with blood, and the left half of the prostate gland disorganized.

Case 2 occurred in a young boy aged 11 years, who while playing was squeezed between the bumpers of two cars. The rectum was torn completely from the sphincter and had retracted into the wound. The anal mucous membrane was torn off in an irregular ragged manner from the mucocutaneous border. The right sacroiliac joint yielded crepitation; the symphysis pubis was loosened and dislocated. A large stream of blood flowed constantly from the rectum. Catheterization was impossible. The patient succumbed in a few hours.

Kirstein⁶ mentions the case of a boy 9 years of age, who while playing in the street was struck by a truck, fell on the ground and was run over. He was carried to the clinic in an unconscious condition. The anus and the rectum were completely separated from the surrounding tissue and had retracted into the wound. The urine was free from blood. The bladder, urethra and abdomen as well as the rectum were found to be intact. There was a fracture of the ascending ramus of the pubis of the right side and a separation of the symphysis pubis to the extent of 4 cm. On the fourth day there was an evacuation of the bowels. The presence of the feces could be felt by the patient, but he had no control of the movements. About the tenth week a urinary fistula developed. Patient recovered, but had not gained complete control of the bowels.

C. L. Franklin⁷ mentions a case of a youth aged 17 years, who was crushed between a "roller beam and a mule" at a cotton mill.

⁵ Deutsch. med. Wochenschrift, Berlin, 1909, vol. xxxv, No. 43, p. 1877.

⁶ Deutsch. Zeitsch. Chirurg., Leipzig, 1905, vol. lxxx, p. 586.

⁷ London Lancet, 1908, vol. ii, p. 1143.

He only lived two hours after his admission to the Oldham Infirmary. Autopsy revealed a vertical tear three-quarters of an inch in length on the anterior wall of the rectum, three and a half inches from the anus. There was no sign of injury to the anus nor was there any fracture of the pelvis, sacrum or coccyx. The pelvic peritoneal cavity was filled with blood, and the liver was slightly lacerated.

Punctured wounds of the rectum may result from falling upon sharp pointed objects. Bush reports a case of perforation of the rectovaginal septum of a woman by the pointed end of an umbrella, on which she was resting (Ashton).

G. R. Turner⁸ reports the case of a lad aged 17 years, who was admitted to the St. George hospital, on account of an injury inflicted while attempting to vault over a broomstick. He was in a comatose condition. On inspection there was found a tear one inch posterior to the anus which led up along the posterior wall of the rectum. Under anesthesia an extensive tear of the anterior wall was also noticed besides the tear in the posterior wall, which was continuous with the track leading from the wound in the skin. Laparotomy was performed seven hours after the accident. The peritoneal cavity was soiled with foul fluid and feces. A transverse tear two inches long was also found in the peritoneum. The serous coat was stripped off from the posterior wall of the bladder. The tear in the gut was sutured, the peritoneal cavity was cleaned and drainage was used. Patient made a good recovery.

Tariel⁹ reports the case of traumatic perforation of the rectum in a boy aged 11 years. He had amused himself by sitting upon the end of a ruler, one end of which rested on the ground. By some accident the ruler entered the anus and perforated the anterior wall of the rectum at 1½ cm. from the anus. Death occurred in about twelve hours from subacute peritonitis. No operation.

D. C. Hawley¹⁰ reports the case of a farmer aged 39 years, who, in sliding down from a hay mow "was impaled on the stale of a hay fork, which was standing against the mow with the tines down." It entered the rectum and was withdrawn by his fellow workman. Forty-eight hours after the accident, he entered the hospital, with a pulse of 110 and a temperature of 101° F. The urine was escaping through the rectum. Examination revealed a tear in the anterior wall of the rectum one and a half inches above the verge, also "a penetrating wound of the urethra and the bladder." Two weeks following the

⁸ London Lancet, 1902, vol. i, p. 1464.

⁹ Soc. Anat. de Paris, 1893, p. 603.

¹⁰ Proctologist, 1909, vol. iii, p. 15.

accident perineal urethrotomy was performed and the rectum was drained. Patient died on the forty-seventh day. "The fork ruptured the bladder at its base a little posterior to the urethral opening; it did not enter the peritoneal cavity. The rectum was injured at the lower portion of the middle third and had entirely healed. The cause of death, diffuse peritonitis; contributing causes, rupture of the rectum and bladder, with acute nephritis, acute peritonitis, and acute endocarditis."

F. A. Goodwin¹¹ reports a case in which a similar accident occurred, and in which there protruded from the anus about six inches of torn and mangled omentum. The sphincter ani was torn and ruptured at the anterior margin, the rectum was lacerated on the anterior wall to the extent of one and a half to two inches. There were no bladder symptoms. The pulse was good, no rise of temperature and no shock. On the following day under general anesthesia, the omental mass was cut off in sections and the stumps returned through the rent into the abdominal cavity. The rectal wound was sutured, and drainage instituted. Patient made a rapid recovery.

The faulty or clumsy use of the syringe tip has, in former years, been the cause of a good many perforating wounds of the rectum. Should the perforation not be discovered until after the fluid has been injected, dangerous symptoms are likely to follow. Dieffenbach¹² mentions a case in which the fluid was injected into the periproctal connective tissue; sloughing of a portion of the rectum took place, but the patient recovered. Esmarch saw 4 cases, none of which terminated fatally; Velpeau reports 8 cases with 6 deaths; Passavant observed 5 cases with 1 death, and Chomel had 2 cases with 2 deaths. Koster states that V. Recklinghausen often found at autopsies funnel shaped ulcers on the anterior wall of the rectum 2 to 8 cm. above the anus, which he declares were caused by the improper use of the syringe (Esmarch). Enemata were formerly given by means of syringes made of metal or of hard rubber, which accounts for the frequent accidents of this nature.

The careless introduction of the stiff rectal bougie has been the cause of perforation of the rectum. In the museum of Guy's Hospital, London, can be seen two specimens in which the rectum was perforated by this means, in which death followed. Even the use of a Kelly tube has produced perforation of the rectal wall. Tuttle knows of 3 cases in which fecal extravasation and death resulted.

¹¹ International Journal of Surg., 1902, p. 284.

¹² Archives générale de méd., 1828, vol. xvi, p. 287.

Ashton reports a case of perforation of the rectum produced by the clumsy introduction of a urethral catheter.

In some operations the rectum is wounded intentionally, as in the surgical treatment of fistula in ano, in operations for organic stricture of the rectum, etc. Occasionally the rectum is wounded accidentally in performing the operation of lateral lithotomy, in perineal prostatectomy and in the separation of adhesions in the pelvic cavity.

In the manual examination of the rectum, according to the method of Simon of Heidelberg, the organ is often injured and serious results have followed. Tuttle reports 4 cases which resulted fatally, 1 by H. B. Sands; 1 by Weir; 1 by Sabine, and 1 by Dandridge. He himself has used this method in over 100 cases and never had any unfortunate result.

Gunshot wounds: During the late civil war in the United States, Otis¹³ collected 103 cases of gunshot injuries of the rectum; of which 44 died, a mortality of 42.7 per cent. Thirty-four of these cases were complicated with bladder wounds. Of these, 14 died, a mortality of 41.17 per cent. In the Franco-Prussian war there were 31 cases of injury of the rectum with a mortality of 48.4 per cent. (Tuttle).

Injury to the rectum may result from the local application of destructive medicaments. C. H. Wintsch¹⁴ reports a case in which a male patient aged 54 years, suffering from piles, injected 2 drams of the oil of turpentine into his rectum. "In about fifteen minutes, he was in severe agony, rolling himself on the floor." One hour later he was seen by a physician. He was then suffering severely, had intense thirst, was nauseated and vomited a yellowish mucus. "There was severe burning sensation at the anus with constant tenesmus and a discharge of a yellowish mucus from the rectum. The entire rectum with the hemorrhoids was prolapsed." The skin of the buttocks and thighs was burned and there was a scarlet rash over the body. On the eleventh day a severe hemorrhage occurred from the rectum, which demanded packing. From that time on there were almost daily hemorrhages for nine days, requiring repeated packing. The lower end of the mucous membrane of the rectum, including the hemorrhoidal region, became gangrenous and sloughed off. A fistulous tract developed and pus continued to pour out from the rectum for a long time. Seven months after the accident the patient was discharged cured.

The case that came under the author's care¹⁵ was of a different kind. A boy aged 4 years, suffering from retention of urine, had been

¹³ Ashurst, *Internat. Encycloped. of Surg.*, vol. ii, p. 199.

¹⁴ *Proctologist*, 1910, p. 259.

¹⁵ *Medical Record*, Oct. 29, 1892.

placed in a sitz-bath containing water so hot as to scald the parts. Two years after the accident, the patient was brought to the clinic on account of difficulty of defecation and of constantly soiling his clothing. Looking at the region involved, it was found that the lower outlet of the pelvis was one mass of cicatricial tissue, limited anteriorly by the scrotum, extending posteriorly nearly to the upper part



Fig. 177.—Before operation.

of the sacrum and encroaching on each side on the buttocks and thighs. Near the anterior portion of the cicatrix was an oblong opening, compressed from side to side, with its greatest diameter from before backward, which opening led in a funnel shape to the anus. A number 25 French urethral bougie could be passed. The strictured canal measured one-half inch in length. The operation consisted in cutting the stricture both anteriorly and posteriorly, and a tongue-shaped flap one inch and a half in length by three-quarters of an inch in width was dissected from the scrotum and perineum and slid back into the anterior incision and attached to it and to the gut by numerous

silk sutures. Into the posterior cut another flap of skin was sewed; but this flap came from the healthy tissue of the left buttock outside of the scar tissue, and it had to be twisted before being sutured to the gut. The anterior flap united nicely, while the posterior one died. Patient was discharged at the end of three weeks with an anus that readily admitted the index finger. One year ago I examined the



Fig. 178.—Taken some months later. Bougie in the right-hand corner could readily be passed.

patient and found that he has good control of the bowels. (See Figs. 177 and 178.)

RUPTURE OF THE RECTUM.

This accident may occur during parturition. The rectovaginal septum may be torn with complete rupture of the perineum; or the descending part of the child may push the rectovaginal septum into the rectal cavity and the child be born through the anus with rupture of the septum, but without severe injury to the anus or perineum (Bushe).

Forcible expulsion of hardened fecal masses may cause complete laceration of the rectum. The laceration may take a vertical or a transverse direction. Mayo reports the case of a lady aged 40 years, of constipated habit, whose bowels had not moved for many hours. While straining at stool, she felt something give way. On the following day some feces passed per vaginam.

Adelman (Esmarch) mentions the case of a woman, aged 72 years, who had been suffering for a long time with a reducible rectal procidentia. After an evacuation of the bowels, she suffered a transverse tear of the rectum with a protrusion of the omentum and several yards of small intestines. Operation was followed by death.

Stein reported a case of a young woman, aged 30 years, who while in a stooping position lifted a heavy vessel from the floor and felt something give way, and found a portion of the gut protruding through the anus. Death occurred on the sixth day from peritonitis. Autopsy revealed a tear ten inches long on the anterior wall of the rectum through which several yards of small intestines and two inches of the cecum had passed. Similar cases are reported by Nedham and Brodie (Esmarch).

Numerous cases of rupture of the rectum have followed the use of the rectal bag (colpeurynter of Peterson) in the operation of suprapubic cystotomy. G. R. Fowler,¹⁶ Cadge,¹⁷ and M. Nicaise¹⁸ have each reported a case. The rupture took place on the anterior wall. On account of the danger that may follow the use of this instrument, many surgeons have discarded it.

Since pneumatic pressure has come into more common use in the arts, rupture of the rectum or sigmoid has become more frequent.

E. Wyllys Andrews¹⁹ reports the case of a Pole, who was brought to the Mercy Hospital, nearly moribund, cyanotic and gasping for breath, with an enormous distention of his whole trunk by what proved to be air. The chest and neck were emphysematous, the abdomen was tightly distended, more globular than in diffuse peritonitis, so that even the skin was tense. "The history was, that the man was brushing or blowing the dust from his clothes and on blowing the dust from the back of his trousers, his fellow workmen placed the hose to his rectum. The patient tried to get away, but the others followed until the injured man fell. The injury occurred in a fractional space of time, as the victim scarcely moved off his place.

¹⁶ Ann. of Surg., vol. xii, p. 129.

¹⁷ Proc. Royal Med. and Surg. Soc., London, 1886, p. 97.

¹⁸ La Semaine Médical, Paris, 1887, p. 387.

¹⁹ Surgery, Gynecology, and Obstetrics, vol. xii, p. 63.

The hose was not inserted in the rectum, as the man was fully dressed. The abdomen was tensely inflated and the free air was felt over the groin and along the attachment of the diaphragm. The thorax was rigidly set and breathing was very fast, 42 to 52 and shallow, the features were anxious and pinched; the pulse small, hard, and about 144. No gas was expelled, and no gas was belched at any time. He moaned continuously. The air-pressure of the pipe is estimated to be between 60 and 65 pounds; there was no nozzle, just a plain $\frac{5}{8}$ -inch hose." On examination at the hospital it was noticed that "there was emphysema extending to the clavicles and down to the groin, and enormous distention of the belly. A rectal tube was inserted and gave no return of air. Dr. Pierce saw the man promptly, and, as no major operation seemed possible, he made an incision under local anesthesia into the peritoneum. There was a strong rush of escaping air, which was held in check by a tampon, so as not to allow the abdomen to collapse too rapidly.

"Half an hour later the pulse was 120, the temperature 99, and the respiration 36; and the cyanosis had disappeared. Five hours after the injury laparotomy was performed. A median incision below the umbilicus showed a peritoneum already soiled by feces and full of bloody, serous exudate. The sigmoid colon was ruptured along the convex border for a distance of five or six inches, with a gaping tear in its serous and muscular coats through which the mucous coat bulged, but it was not so widely torn." The integrity of the bowel was so much compromised that it was thought better to resect the sigmoid than sew up the tear. The two ends of the sigmoid were placed side by side and a lateral anastomosis was made. The abdomen was thoroughly washed out and gutta-percha and bismuth gauze drains were used. Patient recovered.

He collected 16 cases of this kind of accident (including his own) with a mortality of 81.2 per cent. There were 7 cases operated upon, of whom 4 died, a mortality of 57.2 per cent.; 9 cases were not operated upon, with a mortality of 100 per cent. The air-pressure was applied to the patients when fully dressed. The air had to go through, at least, two layers or more of woven material before entering the bowel. In none of these cases was the rectum or anus injured. The force of the air was exerted mainly on the sigmoid flexure of the colon; and the convex surface which received the greatest pressure was the part that gave way.

Symptoms.—There is no special or distinct symptom by which a diagnosis can be made. The history of the accident, the appearance of the parts, the pain, the shock, may give us a clue. The involvement

of the adjoining organs like the bladder or the peritoneum will give us symptoms peculiar to these organs. Often the peritoneum is involved without the presence of pain. Hemorrhage is often slight, although in a few cases it is very severe. Bleeding may not show externally, although the hemorrhage may be so severe as to distend the rectum and colon and produce syncope. The amount of shock is variable. Often it is very severe in a mild case and very trivial in a grave case. It depends a great deal upon the individual that is injured. More or less shock is present in nearly every case. Distention of the abdomen immediately following the accident would indicate the presence of air; coming on some time after the accident, would denote the beginning of peritonitis. This may be followed by chills and fever, anorexia, vomiting, anxious expression of the face, hiccoughing, cold sweat, collapse and death. When the bladder has been injured there is pain in the region of the organ with dysuria. Catheterization of the bladder will often reveal to us from the appearance of the urine whether that viscus has been injured or not. Should the urine contain blood or feces, then the organ has been injured and there is a communication between the two viscera. Should the urethra be injured there will be a flow of urine from the rectum whenever the patient urinates. In perforating wounds of the bladder, leakage from the viscus does not necessarily follow soon after the injury. The contusion of the parts and the edema which soon follows the injury often cause the tract to close and keeps it so until the swelling subsides and the slough is cast off.

Prognosis.—This depends a good deal upon the tissues and organs involved. When the rectum is the only organ injured the gravity is not so great as when some of the adjoining organs are involved. The gravity increases when extravasation of feces has taken place into the cellular tissue or into the bladder or into the peritoneal cavity. The gravity also increases in proportion to the length of time that has elapsed since the time of the injury. A large ragged wound confined to the anus and rectum is less serious than a perforating or stab wound of the same region. Free drainage makes a wound less serious. Injury of the bladder or of the peritoneum makes the case very grave. Septic peritonitis develops as early as the twelfth to the fourteenth hour after injury to the peritoneal cavity. An early laparotomy can often prevent this complication. Of 58 cases of injuries to the rectum, of which 28 cases were complicated with wounds of the peritoneum, Hood²⁰ reported 20 deaths and 6 recoveries. In many of these cases the operation was delayed until long after the period for the develop-

²⁰ Monthly Journal of Medicine and Surgery, June, 1896.

ment of septic peritonitis. In 30 cases in which the peritoneum was not involved all recovered (Tuttle). Hemorrhage is usually controlled by pressure; occasionally it takes place without showing externally. Thrombosis of the rectal veins with inflammation of the venous radicals often takes place. The inflammation may travel upward into the vena porta as a pylephlebitis (Esmarch), and leads in most cases to death. Infection can often be limited by free drainage. Ulcerations, fistulæ, abscesses, and incontinence may follow injuries to the lower bowel.

Treatment.—The most important feature in the treatment of wounds of the rectum is cleanliness and free drainage. In all incised wounds of the anal canal and lower part of the rectum we expect to get primary union. In recent laceration of the anus and rectum following delivery, and in transverse rupture of the rectal wall due to the passage of a large fecal mass, the parts can be united soon after the accident by suturing first the rectal portion before uniting the vaginal surface. Most of the punctured, lacerated, and infected wounds as well as those due to gunshot injuries heal by suppuration and granulation. In recent rectal wounds the fecal matter should be prevented from remaining long in contact with the raw surfaces by frequent cleansing of the parts. Frequent douching should be done in all cases except in perforation of the bladder or of the peritoneum. In these cases the use of dry gauze is advocated. The danger of infection and infiltration of fecal matter into the surrounding tissue is greater the first few days after the injury than later on. As soon as inflammatory action has set in and the wound is discharging pus, the presence of fecal matter in the wound is of less serious moment. By this time the areolar tissue as well as the lymphatic vessels are closed by infiltration of the inflammatory product and there is very little danger of infection. Begin and Dupuytren advocated the immediate division of the sphincter muscle in injury or wounds of the rectum. Simon advocated the same principle with the addition of a drainage-tube. In every case of perforation of the peritoneum the abdomen should be opened at once, the parts thoroughly cleansed, the perforation closed, one end of a drainage-tube placed at the site of the perforation and the other end brought out at the abdominal wound, and the patient placed in Fowler's position.

CHAPTER XXV.

Foreign Bodies in the Rectum and Sigmoid Flexure.

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FOREIGN bodies are frequently encountered in this part of the intestinal canal. They gain entrance into the rectum in one of four ways. First, through the mouth, when the foreign body was swallowed; second, through the anus, where the foreign body was introduced; third, from a neighboring organ through which the foreign body has ulcerated; fourth, the foreign body may originate, *de novo*, in the intestinal canal itself.

All kinds of heterogeneous objects have been found in these cavities, bottles, pots, pieces of wood, nails, screws, coins, knives, forks, spoons, doorknobs, bougies, bars of silver ore, jewelry, beer-glasses, snails, needles, pins, pencils, and many other articles too numerous to mention.

The predisposing causes that have some effect on the arrest or on the formation of foreign bodies in the rectum or sigmoid may be divided into the anatomical, the physiological and the pathological.

ANATOMICAL PREDISPOSING CAUSES.

The pouches or sacculi of the colon disappear as soon as the colon enters the pelvic cavity to become the rectum. Here the lumen of the gut is encroached upon by the presence of numerous folds, called Houston's valves, which extend into the gut and retard the free movement of the fecal contents of the bowel. Inferior to these valves the gut contracts, throwing the mucous membrane into numerous longitudinal folds, which terminate near the anus in the crypts of Morgagni, where small bodies are frequently caught. External and inferior we have the sphincter ani muscle, which closes the lower end of the anal canal.

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PHYSIOLOGICAL PREDISPOSING CAUSES.

The physiological predisposing causes have very little effect on foreign bodies which have gained entrance into the gut, but are more efficient in the production of fecal concretions and coprostasis. By the time the fecal matter has reached the sigmoid flexure or the rectum, it is already very dry and much thickened, due to the absorption of the fluid elements. Diet plays an important rôle; likewise a deficient secretion of the intestinal, biliary, or pancreatic juices has some influence on the production of coprostasis. In districts where there is a good deal of lime salts in the drinking-water the prevalence of concretions is noticeable. When the diet consists of a great deal of indigestible food, as potato, whole corn, fruit-seeds, pebbles or nutshells, there is more likelihood of fecal concretions occurring than if the food were more diversified. It was noticed during the Irish famine in 1846, when the inhabitants consumed the diseased portions of potato with its peeling, that coprostasis was very common, the fecal mass being largely composed of potato with its undigested peel. Diminution of the normal peristalsis of the intestine, whether it is due to paralysis, old age, or sedentary habits, or the use of medicaments like opium, bismuth, etc., may be a predisposing cause.

Under the **pathological predisposing causes** are: narrowing of the lumen of the gut, organic stricture of the rectum or of the sigmoid, hypertrophy or coarctation of Houston's valves, tumors of the rectum or growths of the adjoining tissue pressing upon the gut, diverticula of the intestine, pelvic adhesions, hypertrophy of the prostate gland, hemorrhoids, paralysis of the bowels, ptosis of the large intestine, angulation of the gut, and spasm of the sphincter muscles. All of these may retard, directly or indirectly, the normal movement of the intestinal contents, thereby causing an increased absorption of the fluid element, rendering it more dry and hard, producing a condition very favorable for the development of concretions or the retention of a foreign body.

FOREIGN BODIES INTRODUCED THROUGH THE MOUTH.

One can hardly realize the size, composition, and bizarre shape of the various articles which have been swallowed, and which have passed safely through the intestinal tract without producing any symptoms whatever. Most of them are small and smooth, like buttons, coins, and marbles. Others that are large and irregular are more likely to be arrested. Bodies that have passed through the pyloric orifice are not likely to be detained at the ileocecal valve, but may ultimately find lodg-

ment in the rectum. Pilcher¹ reports the case of a woman suffering from melancholia, who swallowed a large quantity of solid material, including nails, pebbles, a screw, faience, glass, needles, knitting-needles, and a piece of whalebone, and voided through the rectum in the space of six weeks various articles, including nineteen large nails, a screw seventeen centimeters long, several pieces of earthenware, some glass, two knitting-needles, a piece of a sewing-needle, a piece of whalebone, together weighing over 300 grams.

Le Gendre² reports the case of a man who swallowed a silver fork which passed without any ill effect after sojourning in the alimentary canal for fifteen months. Brodie mentions in his lectures the case of a lunatic, who swallowed a sharp-pointed compass with the dull end pointing downward. Fourteen days later it was passed with the feces without any unpleasant effect. Even rough objects may pass without producing any noticeable symptom. Krauer³ reports a 10-month-old baby, who swallowed a small zinc soldier 3 cm. high, 1½ cm. long, and ¾ cm. wide, having six sharp points and corners, and which was passed by the child after remaining in the bowels two days, without any unpleasant symptom. O. Weber⁴ relates a case in which an artificial plate of teeth guarded with clamps was swallowed by a careless owner and which was recovered in three days. Paget and Smith report similar cases. Not every individual is as fortunate. Samuel T. Earle⁵ reports the case of a woman who, while eating, swallowed a plate containing two false teeth. Ten days later she had violent attacks of pain in the abdomen. These attacks would come on every now and then. After the lapse of several months a skiagraph was taken, which located the plate of teeth in the sigmoid flexure on a level with the promontory of the sacrum. With the sigmoidoscope the foreign body was seen and grasped with an alligator forceps and withdrawn in the wake of the instrument.

In the rectum are found Houston's valves, the crypts of Morgagni, and the longitudinal folds of mucous membrane; any one of them may be the means of arresting the foreign body, especially if it is pointed or of an irregular shape. T. L. Hazzard⁶ reports these 2 cases: A girl baby, 2 years old, was suffering for some time with bloody stools containing mucus. Rectal examination revealed a foreign body lying across the bowel low down. A guarded scissors was introduced and the foreign

¹ Poulet, vol. i, p. 225.

² Mentioned by Esmarch, *Krankh. des Mastd.*, etc., p. 55.

³ *Deutsch. med. Wochenschrift*, 1880, No. 32.

⁴ Esmarch, p. 55.

⁵ *Trans. American Proct. Society*, 1908, p. 46.

⁶ *Proctologist*, vol. v, p. 153.

body cut in half. "It proved to be two-thirds of a dead match." Both ends were firmly imbedded in the sides of the bowel. Case 2 is similar to the above except that the foreign body was the femur of a frog.

The author has seen a case in which the sharp point of a plum-seed had penetrated the rectal wall of a child of 18 months, who had been suffering for over a week with pain in the rectum and with more or less tenesmus. A mucoserous discharge came from the anus. On inspection I noticed the bulging of the lower orifice of the rectum. By grasping the parts with the fingers the foreign body could be felt within the rectum. It was easily removed by introducing the finger and drawing it out.

Goodsall⁷ reports 20 cases of foreign bodies that fell under his own observation, in which 19 times the foreign body was a fishbone or other kind of bone, and once it was a pin. "The site of the puncture is within the last inch or three-quarter inch of the rectum."

When large bodies have been swallowed, the attention of the patient is usually drawn to the fact and he often seeks medical advice. Tuttle reports 2 cases in which plates of artificial teeth were swallowed, and which were lodged, one in the sigmoid flexure and the other in the rectum. Hutchinson⁸ reports 2 cases of foreign bodies arrested in the rectum. One was a fishbone "as long as a common sewing-needle and almost as sharp, lodged transversely across the gut." The other was "the breast of a bird."

The length of time that it takes a foreign body to pass through the intestinal tract is most variable. It is something unusual to see a foreign body appear at the lower part of the rectum as early as in the case reported by Cripps, in which a plate of teeth was swallowed at night and recovered the following morning. Tuttle reports a case in which a tin tag of a piece of tobacco was swallowed by a child and was not recovered till the lapse of eighty-four days, when it appeared at the anus with its five points sticking into the mucous membrane. Bryant⁹ reports the case of a woman, aged 43 years, who swallowed thirteen screws. On the forty-first day "the first of the screws passed by the bowel, and, by the end of six months, the last came away."

FOREIGN BODIES INTRODUCED INTO THE RECTUM.

The list of foreign bodies which have been introduced into the rectum is so large and the objects utilized are of such varied sizes and shapes.

⁷ St. Bartholomew's Hospital Rep., vol. xxiii, 1887, p. 71.

⁸ Archiv. of Surg., vol. ix, p. 278.

⁹ Mentioned by Poulet, vol. i, p. 182.

that for the sake of convenience they may be classified into different groups according to the manner or purpose of their introduction.

1. **Foreign Bodies Introduced through Traumatism.**—These are generally large and usually require artificial aid for their removal. Many cases are reported in the literature where individuals have fallen upon foreign bodies which have entered the rectum through the anus.

Poulet mentions the case of Camper,¹⁰ "A sailor fell from a mast of a ship upon some pieces of wood, fragments of which entered through the anus even into the bladder; a vesicorectal fistula resulted." The fistula was operated upon and two oblong calculi were found which had formed at the end of the two pieces of wood.

Esmarch reports a case of Messerschmidt who removed from the rectum of a farmer a curved, hook-like root of a tree, which had entered the rectum four days previously, when the patient slipped while he was in the squatting position in the act of defecation.

F. C. Larimore¹¹ reports the case of a carpenter, aged 20 years, who "slid down a few feet on a hemlock board, when the scaffolding on which he was standing gave way. A large splinter of wood 6½ inches long transfixed the right side of the scrotum and penetrated the abdominal wall." The splinter was removed under ether. Five months after the accident a small splinter was removed from the old cicatrix. One month later Larimore was called in consultation. The patient complained of a slight pain on the left side of the anus. The pulse and temperature were normal. On digital examination of the rectum, something was felt resembling "an oyster shell," which was imbedded in the rectal wall. A fecal mass was detected in the rectal ampulla, which felt like a "fruit-seed" and "then like a piece of wood." Its lower end rested in a pocket on the left side, while its upper end could not be felt. Under ether the foreign body was grasped with a pair of forceps, raised out of its pocket and extracted; hemorrhage followed. The stick measured 5½ inches by ½ inch by ¼ inch. The portion lying in the rectal cavity was incrustated with fecal matter ½ inch thick, "which required a hammer to break it." Patient recovered.

I. L. Firebaugh¹² reports the case of a man, aged 46, unmarried, who claims that he had fallen on a bottle the night before, and that it had entered the rectum. On examination a large bottle was detected in the rectum, the lower end was resting in the hollow of the sacrum and the upper end could be felt in the abdomen "just behind and beneath the navel." Some bladder symptoms were present. Under an

¹⁰ *Prix de l'Académie de chirurg.*, t. xii, p. 165.

¹¹ *Columbus Med. Journal*, 1895, vol. xiv-xv, p. 66.

¹² *Journal of the American Med. Assoc.*, 1909, p. 383.

anesthetic the bottle was removed, dimensions of which were 8 inches long by $7\frac{1}{2}$ inches in circumference. He left the hospital the same evening.

2. Foreign Bodies Introduced for the Purpose of Concealment.—

As a place for concealment, no organ could be better adapted for this purpose than the lower end of the gut. It has been frequently used for this purpose by thieves and criminals.

In the St. Bartholomew's Hospital museum there are two specimens of silver ore (3391 G.) which were removed from the recta of two men working in the silver mines of Chili. One of the specimens weighs 30 ounces, and measures $5\frac{1}{2}$ inches in length by $8\frac{1}{2}$ inches in circumference; the other weighs 8 ounces. It is customary, for the superintendent of these mines, to strip these miners naked and search them carefully whenever they are discharged from the mines. A short piece of twine is often attached to these bars of ore previous to their introduction so as to facilitate their removal from the rectum later on.

In the Kimberley mines in Africa the Kaffirs often secrete diamonds in the rectum. This occurs so often that it has become customary to give these natives a strong purge when their term of work expires, in order to recover any diamond which they may have swallowed or may have concealed in the rectum. By this means many valuable stones have been recovered.

A curious case is reported by Closmadeuc,¹³ of a young convict who died of peritonitis. At the autopsy a cylindrical box, 14 centimeters long, weighing 650 grams, was found lying in the transverse colon. It contained 30 different varieties of tools, of such a nature as to be useful in case he should attempt to escape from prison. This box, or "necessaire," was covered with the omentum of a sheep. It had been introduced into the rectum and had gradually worked its way into the transverse colon.

3. Foreign Bodies Introduced into the Rectum for Medicinal Purposes.—

It occasionally happens that instruments and other bodies used for medicinal purposes have slipped from the grasp of the individual and entered the rectum. Rectal bougies, rectal dilators, and nozzles of syringes have been found in the cavity.

Fergusson¹⁴ removed from the rectum of an elderly man a bougie 24 cm. long by $2\frac{1}{2}$ cm. thick, which had slipped from his hand into the rectum. He had been accustomed, for a long time, to use it on himself in order to relieve his costiveness.

Thomas¹⁵ was called to see an old man who had been accustomed

¹³ Soc. de chirurgie, May 15, 1861.

¹⁴ Practical Surg., p. 750.

¹⁵ Esmarch, p. 59.

for many years to pass a flexible rod, about the thickness of a finger, into the rectum in order to overcome his constipation. One morning as he was in a great hurry to attend to some important business, the rod slipped from his fingers and entered the rectum. He neglected to see a physician until the seventh day, who by palpation over the lower abdomen discovered the upper end of the foreign body to be located in the left hypogastric region, while the lower end could not be felt. By introducing the hand into the rectum he was able to remove the rod from the hollow of the sacrum. It measured 25 cm. in length. Patient recovered.

J. K. Friedjung¹⁶ reports the case of a child 13 months old in whose rectum a thermometer broke. One end disappeared into the rectum and the other remained in the hand of the mother. After remaining in the rectum about fifteen minutes it was expelled into a vessel without having produced any bad results. A gentleman suffering from some rectal trouble was advised by a friend to use a rectal dilator. This he did, using one with a small flange. It had been his custom to allow the instrument to remain in position for some time while he was lying down. On one occasion it had slipped in and required the services of a physician to remove it.

Lewis H. Adler, Jr.,¹⁷ reports the case of a machinist, aged 60 years, who was admitted to the Polyclinic Hospital "with a history that he had been wearing for a long time an instrument in the anus which he called a pile supporter, and that it had suddenly slipped within the bowel and could not be removed. On examination, found a large nodular mass within the rectum firmly wedged in a somewhat lateral position between the spine of the ischium and the promontory of the sacrum. The offending substance felt like a doorknob, and to the shank of it a piece of clothesline had been attached, which broke off short in the efforts made to extract the body. Numerous efforts were made to remove the body, but it seemed impossible to budge it. Ether was administered and the small end was disengaged and turned downward toward the anus and extracted. The foreign body proved to be "the handle and valve of a steam radiator pipe." The patient went home on the third day.

4. Foreign Bodies Introduced into the Rectum by Ignorant or Insane Persons, or by Practical Jokers.—John Good¹⁸ relates the case of a man, aged 74 years, who acknowledged the introduction of a bottle into the rectum, in order "to plug the opening" so as to stop the diarrhea from which he had been suffering; and it had slipped in.

¹⁶ Wiener med. Woch., 1906, p. 1299.

¹⁷ American Med., 1901, vol. ii, p. 107.

¹⁸ London Lancet, 1901, vol. ii, p. 1336.

After a good deal of trouble the foreign body was extracted. It proved to be a "long-necked and cylindrical bottle which had been formerly used for Worcester sauce." He made a complete recovery. Charles H. White¹⁹ describes the case of a man, aged 65 years, a laborer, who was accustomed to relieve his constipation by introducing a small ten-pin into his rectum and it had slipped into his bowel. Under an anesthetic, the lower end of the rectum was dilated and the foreign body was grasped with a volsellum forceps and removed. The larger end of the ten-pin was first delivered. Its dimensions were 10 inches (25 cm.) long by 2 inches (4.5 cm.) wide. The patient left the hospital the next day. T. M. Jenkins²⁰ reports the case of a farmer, aged 33 years, single, who, while walking along the railroad track, was attacked by four tramps and robbed of \$12.00; he still had some loose change in his pocket which he tossed into the snow so as to prevent the tramps from obtaining all the money that he had possessed. This so enraged them that they knocked him down and forced a turnip and a potato into his rectum. Under an anesthetic these were removed. The potato and turnip were peculiarly constructed. The "upper end of the turnip was hollowed out and a hole bored through the root; a hole was also bored through the potato and a stout string passed through it and through the turnip." The potato fitted into the upper excavated end of the turnip and was held in place by the cord passing through both vegetables. The dimensions were 10½ inches in its bipolar circumference and 8 inches round. The large end had been introduced first.

M. Peraire²¹ reports the case of a little girl, aged 8 years, who introduced a hairpin into her rectum. She was a nervous, impressionable child, and was not more mature than other children of the same age.

Verneuil²² reports a case of a man, aged 45, who had been subject to frequent attacks of dysentery. To arrest the frequency of the discharge he had been accustomed to introduce into his rectum different objects of large caliber, to which he always attached a cord, whose end was left hanging out of the anus. One day he had no cord, and a piece of wood 10 cm. long and 8 cm. wide slipped into the gut. Attempts to remove it were ineffectual, the manipulation causing it to go farther and farther up into the gut. Laparotomy was performed, and through a small abdominal incision the foreign body could be felt,

¹⁹ New York Med. Journal, 1905, p. 276.

²⁰ N. Y. Med. Journal, 1894, vol. lix, p. 531.

²¹ Bull. de la Soc. Anat. Par., 1897; vol. lxxii, p. 506.

²² Progrès Méd., May 15, 1880.

wedged in the upper part of the rectum, with its long axis lying anteroposteriorly. The foreign body was loosened and with the finger of his assistant in the rectum it was partially brought down. A linear proctotomy was then performed and the foreign body was grasped with a pair of forceps. After slipping from the forceps several times it was finally delivered. Blood and fetid fecal matter followed. Patient ultimately recovered.

Realli²³ relates an unusual case in which an ignorant peasant farmer thought to relieve himself of the necessity of eating by introducing a thick plug of wood into his rectum. Laparotomy was performed, the sigmoid flexure was opened, and the wooden plug, whose dimensions were 25 cm. long and 10 cm. thick, was extracted. The patient recovered.

To these cases must be added the curious case that occurred to Nollet, surgeon to the Marine Hospital in Brest. A monk, in order to relieve himself of a severe attack of colic, was advised to introduce into the rectum a large bottle of Hungary water, whose cork had previously been perforated with a hole, so that the water could slowly trickle into the bowel. He introduced the bottle partially into the bowel and it slipped in beyond the sphincter. A midwife was called, but she could not relieve him. Various kinds of instruments were used without success. Finally a small boy 8 or 9 years of age was induced to introduce his hand into the rectum. He had sufficient dexterity to grasp the bottle and remove it.

5. Foreign Bodies Introduced into the Rectum to Excite the Sexual Passion.—"It is known that the sexual orgasm may be excited by stimulating the reflex power of the rectum, and it is probable that at the moment when the orgasm is at its height the body used to produce it is allowed to escape from the hand and is lost within the bowel" (Kelsey). Seldom will the patient acknowledge this disgusting habit. The objects usually utilized are long, smooth, and round. It is a fact that this vicious habit exists, for the most part, in old men, due no doubt to the gradual decrease of the virile power, which cannot keep pace with their imagination and their passions.

J. C. Warren²⁴ reports a case of this kind in a man, aged 40 years, who introduced a bottle for this purpose. The foreign body had slipped into the rectum. Its base could readily be felt, while its upper extremity could be palpated in the abdominal cavity, about halfway between the ensiform cartilage and the umbilicus, and considerably to the right of the median line. After numerous ineffectual attempts

²³ Esmarch, p. 60.

²⁴ Boston Med. and Surg. Journal, 1890, vol. cxxii, p. 542.

were made to remove the bottle, a linear proctotomy was made. Then with the finger and forceps, aided by abdominal pressure, the foreign body was removed. It proved to be a catsup-bottle filled with catsup and securely sealed by a screw-top stopper. It measured 9 inches in circumference at its base and 10 inches long.

FOREIGN BODIES IN RECTUM FROM ADJACENT ORGANS.

Foreign bodies may gain entrance into the rectum from the adjacent organs. This happens very rarely. It can only occur when the walls separating the two viscera have ulcerated, allowing free communication of one cavity with the other. We meet it occasionally in extrauterine pregnancy, in gall-stone cases and also in cases of stone of the urinary bladder.

Lewis H. Adler, Jr.,²⁵ reported a case of a woman, aged 42 years, who thought that she was pregnant six years ago. "At no time did she experience any evidence of fetal movements. Her physician told her that he thought that she had had a false conception, as her menses had returned, and she again menstruated regularly. Two years later she contracted a diarrhea, which had kept up ever since, with however, intermissions sometimes as long as two or three months. Six months previous to seeing me she had experienced considerable pain and tenesmus within the rectum. It was felt low down in the pelvis and about the rectum. As many as a dozen paroxysms a day would occur. The diarrhea still continued; many movements occurred in twenty-four hours. About two months before I saw her she passed from the rectum what she termed 'a bunch of bones,' and a month later a piece of skull. Digital examination of the rectum revealed a mass, situated about four inches up the bowel anteriorly, which felt very much like the united halves of a clamshell when half-open, the edges being sharp and exposed. The tissue in which the mass was imbedded was greatly hypertrophied. A few small pieces of bone were removed at this time by breaking them off. The patient was therefore admitted to the Polyclinic, and, on the following day, the mass of bones was removed."

Louis J. Hirschman and Ed. A. Hamilton mention similar cases occurring in the practice of other physicians.

Laroche²⁶ reports the case of a peasant woman, 56 years old, who had been afflicted with prolapsus of the uterus for a long time. After having neglected the disorder for nearly sixteen years, "she consulted,

²⁵ Trans. of American Proct. Soc., 1908.

²⁶ Mentioned by Poulet, vol. ii, p. 195.

in 1808, Janin, who applied an ivory-ball pessary, and advised her to remove it from time to time in order to cleanse it. For four years she worked in the vineyard and felt no distress; during this time the pessary was bent backward. At the end of eight years she began to experience temporary difficulty, at times in passing urine and at times in going to stool." At last she again consulted the surgeon, who found that over half of the pessary had entered the rectum. After having made repeated attempts to remove it, he incised the parts with a bistoury, which enabled him to remove it. After the operation the patient walked over a quarter of a league to her home. The fistulous opening in the vagina gradually closed. The rectal end of the pessary was covered with irregular masses, black in color, fetid in odor, and coated with shining crystals.

Esmarch²⁷ reports 2 similar cases where pessaries have ulcerated into the rectum.

Thomas Copeland²⁸ reports the case of an elderly lady who had been complaining of severe pain, whenever she went to stool. She had been constantly compelled to use purgatives, and notwithstanding this she had great difficulty in having a movement. She was confined to her bed for several weeks with pain in the rectum. Purgatives did not relieve her nor did opiates. Examination with the finger revealed that the lower bowel was filled with hardened feces, which after a good deal of trouble were removed by means of the scoop and fingers. Above this accumulation a large biliary calculus and fluid feces were discovered.

Samuel G. Gant presented at the meeting of the American Proctologic Society, 1900, a urinary calculus weighing 4 ounces, which had ulcerated through the vesicorectal septum, thereby producing constipation.

FOREIGN BODIES FORMED IN THE INTESTINAL TRACT (ENTEROLITHS; COPROLITHS; FECAL STONES).

These may be found in any part of the intestinal tract. Of the 54 cases compiled by Gant²⁹ most of the foreign bodies were located in the rectum. One or more may be found, Gant having found as many as 38 in a single case. It is not necessary that the individual be far advanced in years; even children have been found to harbor them. The oldest individual was a woman aged 92 years, and the

²⁷ Krankh. des Mastd., etc., p. 63.

²⁸ Rectum and Anus, 1824, p. 177.

²⁹ Constipation and Intestinal Obstruction, p. 89.

youngest a child of 6 years. These enteroliths often result from the nature of the food. During the Irish famine of 1846, rectal concretions were often encountered. "These were found to consist of diseased portions of potato mixed with undigested peel" (Cripps).

Dr. Young³⁰ reports the case of a woman, aged 35, who began to suffer at the age of 6 years with pain in the left side, accompanied by the appearance of a hard mass. The pain and swelling appeared regularly every three months, and continued to appear for several years; then the interval between the attacks became three weeks till the patient reached the age of 35 years, at which age she married. Her confinement was easy. Shortly after confinement she suffered severely from the pain and swelling. A large dose of jalap was administered, which was followed by a free evacuation of the bowels, and a disappearance of the mass (size of two fists), and caused the pain to shift suddenly to the region of the anus, where tenesmus, with great pressure and retention of urine followed. The mass now occupied the lower portion of the rectum just above the sphincter. From this location it was extracted with the forceps. The foreign body was oblong and measured 5 inches in circumference. It weighed only 10 drams, and floated when placed in water. Section of the mass showed it to be composed of concentric layers, whose center or nucleus was a withered plum, surrounded by a layer of tissue resembling chewed-up paper. Outside of this was a layer of hard substance, a half-crown in thickness, resembling the appearance of brick, and the whole exterior of the mass was coated by a varnish-like material.

Tuttle³¹ mentions a case of a stone removed from the rectum of an elderly lady which was 4 inches long by $2\frac{3}{4}$ inches wide, of elliptical shape with rounded ends, smooth and polished.

White³² treated a patient who had been suffering for four weeks with colicky pain and diarrhea which had greatly exhausted him. He found that the anus was patulous and excoriated, and from the rectum a thin, fetid discharge flowed. After removing four large fecal concretions, which contained numerous cherry-stones, all of the unpleasant symptoms disappeared.

W. Harrison Cripps³³ exhibited a specimen of fecal stone which was removed from a woman aged 60, who had, for eighteen months, symptoms associated with a constant desire to go to the closet, but

³⁰ Phil. Trans., vol. xxiii, p. 200, mentioned by Copeland.

³¹ Rect. and Anus, p. 898.

³² Mentioned by Esmarch, p. 62.

³³ Trans. of Pathol. Soc. of London, 1897, vol. xlviii, p. 122.

never passed any solid matter. The movements were mostly mixed with mucus, very seldom with blood. It was supposed to be a case of malignant disease of the bowel. On digital examination a "densely hard, circular mass could be felt, about the size of a lawn-tennis ball," which was lying in the rectal pouch. The finger could not be passed between it and the rectal wall. After division of the parts posteriorly to the coccyx, the concretion was removed with a lithotomy scoop. It weighed 6 ounces and on section appeared to be formed of concentric layers of fecal matter. No nucleus in the form of a foreign body could be detected.

Often a large quantity of foreign bodies of one kind or another are swallowed. This mixed with a small quantity of the fecal contents of the bowel often packs in the rectum.

M. Vigouroux³⁴ presented two bottles filled with pebbles and some pieces of glass, which he had removed from the rectal ampulla of a lunatic at Asile de Vaucluse. The patient had suffered for several days with violent colicky pains and diarrhea. He was confined to his bed, and when an attempt was made to take his temperature by the rectum it was found impossible to introduce the thermometer on account of the presence of these foreign bodies. All attempts to evacuate the rectal pouch were futile until chloroform was given, when 270 of these pebbles, mostly round and mixed with some broken glass, were removed. The colicky pains ceased, notwithstanding that hundreds of these pebbles still came from the rectum.

Tuttle removed from the rectum of a lady a mass of grapeseeds "as large as a fetal head, that weighed 22 ounces."

J. Hutchinson³⁵ reports the case of a woman whose chief complaint was constipation. Digital examination revealed that the entire "rectum was occupied by at least one pint of maize, the corns of which had been swallowed whole. They had finally accumulated, unmixed with feces, just above the anus and completely blocked the bowel."

Symptoms.—These may be both subjective and objective. A foreign body that has entered the alimentary tract through the mouth may not produce any symptom until it reaches the lower outlet of the canal. If it is smooth and round like a button or a marble, there will be no pain unless attempts at defecation are made. If it is a sharp body like a piece of oyster-shell or the scale of a fish, and is arrested in a crypt of Morgagni, the pain is more or less constant. Should the foreign body be pointed like a fishbone and penetrate the mucous

³⁴ Bull. et Méd. Soc. Anat. de Par., 1903, vol. lxxviii, p. 374.

³⁵ Archiv. of Surg., vol. ix, p. 278.

membrane, or should the foreign body be grasped by the sphincter muscle, the pain is more constant and more severe. The longer the foreign body remains in the rectum, the more acute does the pain become; constant desire to defecate supervenes, with tenesmus and mucous discharge tinged with more or less blood. The functions of the neighboring organs are often disturbed. There is painful and frequent micturition, often followed by retention of urine, neuralgic pains shooting down the groins and thighs and often down to the legs, pain in the testicles and in the lower abdomen. Should the foreign body be large with smooth edges there will be no pain, but a feeling of fullness, which gradually becomes more of a dull, aching character. Any exertion, whether straining at stool, coughing, walking or sitting down may increase it. Direct pressure on the perineum often ameliorates the pain. Constipation is frequently present, due to the spasmodic contraction of the sphincter muscle; and when complete obstruction of the bowel takes place, grave constitutional symptoms, such as nausea and vomiting, hiccoughing, cold sweats, fainting, convulsions, and collapse with high fever and rapid pulse may supervene.

The facial expression often indicates the gravity of the case. If the obstruction is not complete a thin, very offensive fetid discharge escapes from the rectum which may excoriate the anus and the adjacent parts.

Objective Symptoms.—If the foreign body has been swallowed and comes from the upper part of the alimentary tract the symptoms will be obscure unless the foreign body is low down and presses upon the perineum, when there is likely to be more or less of a bulging of the anus. A plumseed in a case under the author's care produced a slight bulging of the anus in a child 18 months old. It had been present for over a week and had not been diagnosed correctly by the family physician. A moist condition of the anus, be it pus or mucus, a protruded hemorrhoid or a prolapsed mucous membrane would not indicate the presence of a foreign body in the rectum.

Should the foreign body be introduced through the anus, then an "edematous and cyanotic puffiness" is often noticed (Poulet). Very often the parts are bruised; fissures and abrasions may be present. It is surprising to notice the size of the foreign bodies that have been introduced through the anus without producing any appreciable sign of injury. According to Alibrán, constriction of the sphincter muscle is always present. "The organ is often infundibuliform" in shape. If hemorrhage has taken place it usually has ceased by the time the examination is made. If the foreign body is of large size and located low down there will be more or less bulging of the

perineum, and there will be congestion and fullness of the hemorrhoidal vessels in and around the anus.

Diagnosis.—The best means of making a diagnosis is the tactile sense of the educated finger, supplemented if necessary with the rectal speculum and the X-ray. When the foreign body is low down, within the reach of the finger, the introduction of that member is all that is necessary. Should the foreign body be located higher up, beyond the reach of the finger, then the rectal tube will come into play. Better than either is the X-ray. By means of it, the size, shape, position, and location and often the composition of the foreign body can be ascertained. A foreign body that is large or long can often be detected by palpation through the abdominal wall. Some have been detected lying in the sigmoid flexure, others in the descending and a few in the transverse colon. It is occasionally an easy matter to make a diagnosis of a foreign body in the rectum; many times it is difficult; often it is impossible. With the history of having swallowed a foreign body to guide us, the diagnosis is easy. But when there is no history of the ingestion of a foreign body, and with the reticence on the part of the patient in regard to having introduced anything into his rectum, it is almost impossible to make a diagnosis. Every one of the symptoms that the patient may complain of is identical with symptoms of other diseases met with in this region; so that, unless a careful examination is made a wrong diagnosis is likely to result. Poulet says: "There is not a disease in this or the adjacent organs which has not been mistaken for these cases of foreign bodies or stercoraceous tumors." Cancerous growths, sarcomatous tumors, enchondromata, uterine growths, prostatic hypertrophies, and hemorrhoids have all been mistaken for them. These mistakes are not likely to occur if we follow the suggestion of Boeckel, who advises that "we should always perform rectal touch when constipation has existed for several days." Urinary troubles should be carefully investigated, for they are often deceptive and lead us off the track. Stercoraceous tumors with pronounced bladder symptoms are often treated as bladder or prostatic troubles. Ptosis of the intestines often produces symptoms resembling foreign bodies in the rectum.

The Fate of the Foreign Body.—What becomes of the foreign body in the rectum? If it has been swallowed it may take one of several courses. First, after remaining in the rectum for a variable period it may be expelled by the unaided efforts of nature. Such substances as coins, seeds, husks of grain, are often expelled without the knowledge of the patient. But if the foreign body is sharp or angular it may do some damage in its course through the rectum and anus. Irritable ulcers of the anus may originate in this manner. Often the foreign body is

arrested in the rectum on account of its sharp edges penetrating the mucous membrane. In such cases the point of contact may be the beginning of an ulceration, through which the foreign body may wander into the adjacent tissue, and produce a fistula, an ischiorectal abscess, or a localized peritonitis. A unique case is reported by Malin (Esmarch), in which a pregnant woman swallowed some fishbones, which lodged in her rectum, and which migrated from the rectum of the mother into the body of the fetus. A miscarriage occurred in the fifth month and, upon examining the fetus, one fishbone was found in the shoulder and another in the thigh.

Sometimes a foreign body remains a long time in the intestine and may become the nucleus of a concretion around which layer after layer of fecal matter is deposited, interspersed with calcareous salts. The concretions usually originate in that part of the large intestine (occasionally in the small) which is the least movable, *i.e.*, the cecum, hepatic and splenic flexures of the colon. In their journey to the rectum they may not produce any symptoms beyond colicky pains, until they reach the rectum, when there is a feeling of fullness, which is followed by an irresistible desire for an evacuation. The colicky pains have very little effect on the expulsion of the fecal mass. Repeated efforts to empty the gut of its contents follow each other frequently without producing the desired result. Only mucus or mucus tinged with blood and fetid material comes from the anus. As long as the patient keeps quiet in a prone position, the expulsive efforts are held in abeyance, but as soon as the patient moves or gets in an upright position the spasms and straining supervene. When foreign bodies are introduced through the anus, a different state of affairs exists. They are usually large and mostly smooth. They rarely do damage to the anal canal unless the patient sits or falls upon the foreign body. They often remain quiescent for some time before they produce painful symptoms which cause the individual to seek medical advice. The foreign body does not necessarily remain in the lower part of the rectum, but may wander farther up the gut into the sigmoid, descending or transverse colon, or it may become tightly wedged in the pelvis, or perforate the intestinal wall and lie freely in the peritoneal cavity, or may ulcerate into the urinary bladder or be the exciting cause of a local peritonitis or an ischiorectal abscess.

Prognosis.—As a general rule, the prognosis is favorable. Foreign bodies that have been swallowed and have safely passed through the alimentary canal until arrested at the anus are usually small. They can usually be felt just within the anus and removed from their fixed position. In 20 cases reported by D. H. Goodsall, the location of the foreign body was within $\frac{3}{4}$ inch to 1 inch of the lower end of the

rectum. When introduced into the rectum through the anus, the prognosis is also good. A great deal depends upon the composition of the foreign body, whether it is fragile or not; also whether it is located in the lower part of the rectum or higher up in the intestinal tract. For in the removal of a fragile body there is great danger of breaking it and injuring the walls of the rectum. The sharp edges of the broken body may penetrate a large blood-vessel and produce free hemorrhage or may perforate into the peritoneal cavity, causing peritonitis. The higher the foreign body is located the more serious is the prognosis, on account of the danger of injuring the peritoneal coat. And last, the length of time that has elapsed since the introduction of the foreign body adds greatly to the gravity of the case. Manipulation may change the prognosis from favorable to unfavorable, especially if damage has been done to the rectal wall.

Treatment.—After the detection of the foreign body in the rectum the first thing to do, before extraction is attempted, is to empty the bladder and wash out the rectum with water to which a disinfectant has been added. If the foreign body is a stercoraceous concretion, a good physic by the mouth and a high enema is often sufficient to remove the mass. Should these fail an attempt should be made to extract the mass with the finger and the forceps, or the mass may be broken up into fragments and washed out with the syringe. Little by little the offending mass is reduced in size; one must not be in too great a hurry, otherwise injury to the parts may result. Often peroxide of hydrogen injected into the rectum hastens the breaking up of the mass. When the foreign body is small the extraction can often be accomplished with the fingers aided with a pair of forceps. Should the foreign body be large and fragile, like a tumbler or a lamp-chimney, the extraction is more difficult. We must be very careful not to break them. Should this happen there is great danger of injuring the walls or of having severe hemorrhage or perforation. It is almost impossible to grasp these bodies with a forceps without breaking them. Frequently, in the attempts made to remove these foreign bodies, they are pushed farther up into the bowel. When the surgeon attempts to remove a fragile body he should make every effort to protect the rectal walls from injury by packing gauze or linen between it and the gut. Should the foreign body be so large or of such a shape that dilatation does not give enough room for its extraction the lower opening can be enlarged by an incision posteriorly to the coccyx, or the coccyx may be removed. G. W. Combs³⁶ reports the case of a tramp in which a beer-glass produced obstruction of the bowels. Attempts to remove it with the forceps failed and the glass was broken. The anus

³⁶ American Medical Journal, 1909, vol. liii, p. 1395.

was then cut posteriorly as far as the coccyx, which allowed the glass to be removed. On account of the fetid odor, no stitches were used. The glass was 7 inches in circumference and 4 inches in length.

T. W. Dowden³⁷ mentions the case of a male, aged 30, who entered the hospital with a tumbler in his rectum. An X-ray picture showed a tumbler $3\frac{1}{2}$ inches in length with the narrow end pointing upward. Under an anesthetic it was impossible to remove it without getting more space. The anus was split posteriorly and the coccyx was excised, when the foreign body was easily extracted. The mouth of the tumbler measured $2\frac{1}{4}$ inches and the base $1\frac{3}{4}$ inches. T. L. Hazzard removed a 3-ounce prescription bottle, the mouth pointing upward, with a blunt hook without anesthetizing the patient.

Should the foreign body be composed of non-fragile material the use of the forceps is indicated, or the operator may make use of any instrument that may strike his fancy. Blunt hooks, gimlets, obstetric forceps and other instruments have been used successfully. In case the foreign body is rough, the removal of the same will try the ingenuity of the surgeon, as in the peculiar case reported by Marchettis³⁸ in which a dried boar's tail with its bristles cut short was introduced into the rectum of a woman. The tip of the tail protruded from the anus. Every attempt to remove the foreign body caused the bristles to bury more deeply into the mucous membrane. In order to overcome this, Marchettis slipped a hollow reed over the boar's tail after having tied a string to the tip of the tail, which he passed through the hollow reed. Holding the tail by means of the string in one hand he pushed the hollow reed over the tail, thus reversing the direction of the bristles, and loosening them from the mucous membrane, and easily removed it. Should the foreign body be narrow like a hairpin, wire, toothpick, fishbone, or a match, it can easily be cut in two and each segment removed separately. Should a foreign body be hollow with its mouth pointing upward, and have been present in the bowel for some time, the removal of it is a very serious matter. The severe straining and the tenesmus which a foreign body causes will produce a prolapsus of the mucous membrane of the rectum into the open mouth of the vessel. This prolapsed mucous membrane becomes swollen and congested, closing up completely the lumen of the gut. To remove such a foreign body it is necessary to break the object without injuring the prolapsed mucous membrane. The congestion of the mucous membrane can then be relieved with adrenalin before an attempt is made for the removal of the foreign body. Should the foreign body be situated high up in the rectum or firmly wedged in the pelvis or

³⁷ Edinburgh Med. Jour., 1909, p. 555.

³⁸ Poulet, p. 260.

have escaped into the peritoneal cavity, celiotomy should be performed. The line of incision should always be on the left side, preferably in the outer edge of the left rectus muscle. As soon as the abdomen is open the gut containing the foreign body should be brought outside the abdominal incision, if possible; otherwise the gut is opened *in situ* after having protected with sterile aprons the rest of the abdominal cavity from the danger of infection. After the removal of the foreign body, the gut should be closed and dropped into the abdominal cavity. Should there be gangrene of the gut, it is advisable that this portion of the gut should be resected, and a lateral anastomosis made, or the bowel can be attached to the abdominal wall and an artificial anus made. Should the foreign body have escaped through a perforation into the peritoneal cavity it is imperative to operate at once, remove the foreign body, find the rent through which it has escaped, sew up the tear, clean out the peritoneal cavity with dry sponges, put a drain in Douglas's *cul-de-sac*, close up the abdominal wound, and place the patient in Fowler's position. It is a fact well known that the peritoneal cavity is tolerant of the presence of a small quantity of fecal matter. The Trendelenburg position should not be used until the peritoneal cavity has been thoroughly cleaned of the escaped fecal matter, otherwise the fecal matter might gravitate toward the diaphragm and produce general peritoneal infection.

CHAPTER XXVI.

The Reflexes and Neuroses of the Rectum and Anus.

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THE consideration of the reflexes and neuroses of the rectum opens up a vast field for study. Much has been written about the hysterical rectum and about neuralgia of the rectum. Many writers place in this category all rectal cases having unusual symptoms, either motor or sensory, the causes of which they could not explain. As the sum of our proctologic knowledge grows, the number of cases so classified becomes proportionately smaller. Today, we are able, by demonstrating local lesions, pathological changes in the spinal cord, lesions of the sympathetic ganglia, and interferences with the reflex arcs, to interpret many symptoms before inexplicable.

The close anatomical association of the blood and nerve supplies of the rectum with those of the genitourinary system, from both the symptomatic and the pathologic standpoints, makes the subject one of extreme importance.

According to Mathews, "The nerve supply of the rectum comes from two sources. It receives an abundant supply from the hypogastric plexus of the sympathetic system. In addition to these, we find a supply direct from the spinal nerves; those to the rectum coming from the fourth anterior sacral nerve. This is the only part of the intestinal canal which receives branches direct from the spinal nerves."

Tuttle says: "The rectum proper is largely supplied by the sympathetic system; it receives branches from the mesenteric, sacral and hypogastric plexuses. It also receives filaments from the third, fourth and fifth sacral nerves. The mucous membrane of the rectum

becomes less and less sensitive from below upward, thus indicating the absence of sensitive fibers in this portion of the gut, a fact which has been corroborated by microscopic and anatomical research.

"The external sphincter muscle receives its nerve supply from three sources; two filaments from branches formed by the third, fourth, and fifth sacral nerves extend transversely across the ischio-rectal fossa, and distribute themselves to the middle portion of the muscle and to the perianal cutaneous surfaces; a filament which comes off from the internal pudic, just before its division into terminal branches, supplies the anterior portion of the muscle, and is called the anterior sphincterian nerve; while a filament coming off from the fifth and sixth sacral nerves passes down into the hollow of the sacrum, between the levator ani muscle and the rectococcygeus ligament, and finally reaches the posterior superficial surface of the external sphincter. Morestin calls this the lesser sphincterian nerve. All these filaments possess both sensitive and motor fibers, and with them are distributed filaments of the sympathetic nerve. The central origin of the nerve supply of the anus and rectum is said to be located about the level of the first lumbar vertebra. This center is practically the same as that of the genitourinary apparatus, which fact accounts in a large measure for the various reflexes between the two systems. The inhibitory center of this nerve supply is situated in the brain, but the exact location is unknown."

Piersol, describing the visceral branches of the pudendal plexus (lower portion of the sacral plexus) says "The visceral branches are really white rami communicantes. They are derived from the second and third or the third and fourth sacral nerves and are distributed to the pelvic viscera by way of the pelvic plexus of the sympathetic.

"The hemorrhoidal plexus (*plexus hemorrhoidalis medius*) arises from the upper portion of the pelvic plexus and, after inosculating with the superior hemorrhoidal branches (*nn. hemorrhoidales superiores*) of the inferior mesenteric plexus, are distributed to the rectum.

"The inferior mesenteric plexus (*plexus mesentericus inferior*) is derived from the left portion of the aortic plexus and follows the course and distribution of the artery for which it is named. Situated a short distance beyond its origin is the small inferior mesenteric ganglion. From this plexus branches are distributed to the descending and sigmoid colons and to the upper portion of the rectum."

Experiments by L. R. Müller and other investigators, seem to bear out the view that the innervation for both automatic rectal and automatic vesical functions is situated in the sympathetic system, and that the spinal cord is simply the pathway for sensory impulses to the

brain, and of cerebral impulses governing the voluntary control of the striated vesical and rectal sphincters. Alterations in abdominal tension also are governed by impulses directly from the spinal cord. Sahli epitomizes as follows:—

“If the spinal cord of the dog is divided above the sacral segments, or if the sacral segments are extirpated, the result is practically the same. At first, however, there is retention of the urine and of the feces. After a time, however, this urinary and rectal retention disappears and is replaced by periodic evacuations, differing from the normal only in that they are involuntary. Since this re-establishment of periodic evacuations occurs even after complete extirpation of the lumbar and sacral cord, the central (automatic) mechanism for these functions evidently must be situated outside of the spinal cord in the sympathetic system. Extirpation of the lowermost portion of the spinal cord or simply the transverse section, is followed by complete loss of the influence of the will upon the evacuations of the bladder and rectum, and such evacuations become purely automatic, as may easily be recognized from the condition of the animal. The animals are, of course, anesthetic for the purposes of evacuation. Immediately after extirpation of the sacral cord the anus gapes from paralysis of the striated sphincter, but it gradually becomes closed, evidently as the result of the vicarious action of the involuntary musculature of the internal sphincter. The striated sphincter, however, remains paralyzed, and the anal reflex is permanently destroyed. If the spinal cord is simply divided above the sacral segment the tonus of the sphincter and the anal reflex are maintained; in fact, both may be even accentuated.

“From these experimental data it is easy to assume (1) that the actual centers for the (automatic) evacuation of the bladder and rectum are situated outside of the spinal cord in the sympathetic system; (2) that motor fibers reach this sympathetic apparatus through the spinal cord by means of the rami communicantes from the lumbar and sacral segments; and (3) that the motor fibers for the striated muscles of the pelvic floor, which effect the voluntary closure of the bladder and rectum, arise directly from the spinal cord, and have nothing to do with the sympathetic. The sensory impulses to the brain are necessarily conducted by the spinal cord.”

The absence of any striated muscle fibers in the rectum proper would, to my mind, preclude the possibility that the rectum itself is supplied, in any manner, by nerve fibers coming directly from the spinal cord. The motor and sensory fibers from the spinal nerves are distributed to the striated muscles, the levator ani muscles and to the

PLATE XVIII.



The anal skin up to the anorectal line, the external sphincter and the levator ani muscles are tinted red, to show the spinal nerve supply. The rectal mucosa, the internal sphincter, and the muscular wall of the rectum, supplied only with a sympathetic innervation, are colored blue. Hypertrophied anal papillæ are also shown.

external sphincter, and to the perianal skin and the modified cutaneous lining of the anus, as far up as the semilunar valves of Morgagni, and to the anal papillæ.

My own experiments have failed to demonstrate that any pain or tactile sensations extend above the anorectal line. Above this point muscle sense and pressure sense only are present. The mucosa could be grasped with hemostats and the forceps locked, without the patient being aware of the fact. Traction made upon the mucosa gave the patient no discomfort. The patient complained of a desire to defecate when pressure was made upon the rectal wall. An imperative desire to defecate was felt when pressure was made directly on the floor of the rectal ampulla, particularly when the pressure was made upon the anal papillæ. Indeed, a gentle pinching of the anal papillæ, even though not hard enough to elicit pain, produced this same sense of imperative desire for defecation. The anal papillæ were found to be quite sensitive to painful impressions and to touch. The slightest touch with a few fibers of cotton could be distinctly felt.

That the rectal wall itself contains no direct spinal nerve representation seems evident from the absence of sensation when the stimuli are confined to the rectum. The sensations felt when pressure is exerted on the rectum are probably due to pressure upon the muscular coats of the rectum, the levator ani muscles, and upon the pelvic wall, while those felt in the rectal floor, because of the presence of the anal papillæ, are of the nature of cutaneous sensations, those of touch and of pain being the most prominent. Thus, the presence of feces in the rectum causes a sense of fullness and of muscle pressure which is communicated to the brain, and there translated into a desire for stool. When feces press upon the floor of the rectal ampulla, the desire for stool becomes imperative and a powerful inhibitory stimulus is required to prevent their expulsion. This is probably because the sense of touch and of pain first appear at the anorectal line. The voluntary muscles (the levator ani and the external sphincter) are firmly contracted, voluntarily and reflexly, until such time as the individual finds it convenient to have an evacuation. The afferent visceral impulses to the sympathetic ganglia are transformed into efferent impulses, causing contractions of the involuntary musculature of the rectum. The action of this short reflex arc would result in automatic evacuation, were it not neutralized by the voluntary contraction of the striated sphincter and of the levator ani muscles.

If defecation be delayed voluntarily, the reflex becomes exhausted and the desire wears off until such time as the collection of feces in the rectum causes, by pressure, excessive stimulation, rendering the

act beyond the control of voluntary inhibition. For this reason neglect of the calls of nature is the chief factor in producing cases of *habit* constipation.

Were it not for this power of voluntary inhibition, the act of defecation would become purely automatic, the rectum emptying itself, involuntarily and reflexly, so soon as enough distention occurred to generate afferent sympathetic impulses of sufficient intensity to excite efferent, motor contraction. This is true only when the reflex arc is intact. In certain diseases of the nervous system, this arc is impaired and either feces are retained for long periods of time or a continuous flow of feces results.

It has been stated that when cerebral control has been withdrawn, the act of defecation becomes purely automatic. Normally, when feces cause enough pressure upon the rectal wall, the sphincters relax, both reflexly and automatically, to allow the rectum to rid itself of its contents. By an effort of the will we are able to control this by contracting the external sphincter, thus closing the anal canal until a convenient opportunity presents for relief. When the external sphincter is contracted voluntarily, the internal sphincter closes reflexly. Should the desire for stool be very strong we are able to assist the action of the external sphincter by firmly contracting the glutei muscles. Stimuli involving the rectum only, are usually associated with tenesmus and an excess in the number of stools, either from increased muscular contraction, from increased secretion, or from both. A paralysis of the motor apparatus of the rectum proper, or a suspension of secretion, may result in the production of a constipation. Irritations, involving the perianal and intraanal skin, and the external sphincter muscle, usually cause constipation, since the sphincters are reflexly contracted, and cannot be *voluntarily relaxed*, the other muscles of defecation being unable to overcome the obstruction. *The external sphincter must be relaxed reflexly, but may be contracted both reflexly and voluntarily.*

In addition to *automaticity* there is a marked tendency towards *periodicity* in the exercise of the excretory functions. This periodicity we call *habit*. It is remarkable how firmly habits enter into the exercise of unconscious and of voluntary acts. Thus patients can train themselves into having daily stools at approximately the same time of the day. The bladder is trained to tolerate the relatively large amounts of urine secreted during the night, while the same amount of vesical distention, occurring during the day, would cause great distress and an imperative desire for evacuation. When this adjustment is not working smoothly, enuresis results.

We must not forget that in addition to visceral motor impulses,

we have visceral secretory impulses. Disturbances in the integrity of this secretory arc may result in an insufficient secretion or in an excessive secretion of mucus in the lower bowel. Constipation and diarrhea in these cases is the result, of disturbances, not of motor, but of secretory function. Necessity may cause compensatory alterations in the secretions. Thus when the spinal cord has been divided or a portion destroyed, either by disease or by operation, and the sphincteric control has been impaired, secretion is diminished and the patient becomes constipated, or rather the stools become of firmer consistency, requiring the exertion of considerable force by the accessory abdominal muscles to expel them. This same secretory phenomenon has been noted after the operation of colostomy, the patient at first having no control, there being continuous leakage. After some time has elapsed, it will be found that the patients complain less bitterly of their condition, and careful questioning will elicit the information that the number of stools has been reduced to two or three a day, and the patient feels nearly normal. On the other hand, absorption of the liquid constituents of the bowel contents may be more complete, thus adding to the consistency of the stool. Compensatory muscular contractions, by simulating sphincteric action, may materially assist in reducing the number of the stools, and aid in establishing some control.

Mental impressions may take the place of peripheral nerve stimulation and produce disturbances in function. Fear and excitement may produce either constipation or incontinence, depending upon stimulation or suspension of function of the inhibitory center for defecation, in the brain.

Inhibition may be either voluntary, reflex or a combination of these. Should the stimulation be secretory, instead of incontinence, a diarrhea may result. Advantage is taken of this influence of mind over body, when treating cases of purely habit constipation, in which encouragement and mental suggestion will do more to bring about a cure than all of the laxatives ever discovered.

The perineum, urethra, prostate, bladder and vagina, also receive a part of their sympathetic and spinal innervation from the same source as the rectum, so that any disease of these structures may produce rectal symptoms, while, on the other hand, diseases of the rectum or any local irritation of that organ may produce marked symptoms referable to the genitourinary tract.

Because of its extensive and complicated innervation, lesions involving the cerebral, spinal or sympathetic nerve-supply may produce marked changes in the muscle tone of the rectum and anus, and interfere with its function of rhythmic evacuation and voluntary control.

Reflexes, to some extent, are under the control of the cerebral centers so that hysteria and mental impressions may play an important part in producing startling and unusual manifestations.

We must differentiate between diseases of the rectum producing symptoms in adjacent organs and lesions in extrarectal structures producing rectal symptoms. Stricture of the urethra, prostatitis, seminal vesiculitis, ovarian and uterine disease, vesical and renal calculi, and tumors and inflammations of the bladder, in addition to the local symptoms peculiar to the lesion, frequently have associated with them pain in the rectum, tenesmus and backache in the lumbar and sacral regions, that often are erroneously ascribed to hemorrhoidal disease. Uterine displacements, prolapsed ovaries, and pelvic inflammations are frequently overlooked, and these patients, at times, are operated upon for some slight rectal lesion, simply because their symptoms are referred to the rectum. Illustrative of this, a retroverted uterus may be the causative factor in producing piles. An operation upon the hemorrhoids would only partially relieve the symptoms, while the correction of the uterine abnormality would be followed by immediate relief, and the piles, unless well developed, in all probability would give little trouble. On the other hand, the so-called, referred pains in extrarectal organs may be explained by the sensory irritation produced by the anorectal lesion causing more or less disturbance in its spinal segment which, in turn, is transmitted to other areas represented in the same segment of the cord.

Among the more important symptoms are those due to the reflexes, which may arise either from areas innervated by the sympathetic or the spinal nerves. These reflexes may be manifested either as motor spasms, as sensory disturbances, or as alterations in secretion.

Reflex pains due to anorectal disease are of frequent occurrence. In fissure of the anus, the pain may be referred to the sacrum, the prostate, the bladder, or to the ovaries. Not infrequently the pain is referred down the thigh or the leg. This is explained because of the contiguity of representation in the spinal cord, of the spinal and sympathetic nerves supplying these various structures. Intestinal disturbances, such as flatulence, indigestion and abdominal pains may be so produced. Tuttle mentions strabismus as an occasional reflex associated with anal fissure. It is more than probable that the strabismus is not caused directly by the rectal lesion, but that it is simply the expression of nervousness in a person with poor oculomotor balance, for we have frequently seen patients in whom a strabismus was noticeable only when they were under the influence of excitement, pain or of nerve exhaustion.

One of the common, so-called reflexes of internal hemorrhoids is pain, referred to the sacrum, and accompanied by a sense of weight in

the pelvis. This is probably due to the rectal congestion and resulting interference with the circulation to the spinal nerves coming from the sacrum, and to pressure upon the rectal walls communicated to the levator ani muscles.

Tumors and strictures of the upper rectum, and retained flatus, because of pressure upon the peritoneum, may cause abdominal pain, which may be referred to the appendix or to the ovaries. In this connection, it should be remembered that reflex pains, in their distribution, seem to show a predilection for organs either diseased or congested. This seems to be a reasonable statement when we consider that the nerves, supplying any congested or diseased organ or structure, are in a continuous state of irritability and are extremely susceptible to afferent impulses, although we may have pain referred to perfectly healthy structures. A normal nerve may carry a reflex, while a diseased or irritated nerve may carry symptoms of its own.

Differentiation between spinal and sympathetic or visceral forms of reflexes is somewhat difficult. Spinal or somatic reflexes may be divided into tendon or muscle reflexes and into skin reflexes. Only the latter concern us in the consideration of anorectal conditions. In the skin reflex, the response takes place early and quickly, and is rapidly exhausted, so that in a short time it cannot be elicited. The abdominal, plantar, cremasteric and anal reflexes may be taken as types of a spinal, skin reflex. Sympathetic reflexes are of the deep or visceral type and are generally somewhat slow in development, such as is the delayed pain, following the taking of food in patients suffering with gastric ulcer. This pain is referred to the abdominal wall, with or without muscular spasm. Referred pain from any of the intraabdominal organs is of this same nature. These sympathetic reflexes are more sustained than are the somatic type, and may persist over long periods of time. Sympathetic reflexes, in addition to motor manifestations, may take the form of secretory disturbances, so that afferent stimulation may be followed by variations in the secretory functions. Thus, irritation of the rectal mucosa may be followed by an excessive secretion of mucus, while acute inflammations of the rectum either increase or inhibit the secretions. In fissure of the anus there is at first a spinal reflex, evidenced in a slight spasm of the sphincter taking place at the time of stool or upon rectal examination. This is followed by a mixed reflex, in the nature of excessive pain, coming on some time after stool. This is due to the contraction of the sphincter muscles interfering with the circulation of the blood to the inflamed and exposed nerves in the base of the ulcer. The contraction of the internal sphincter represents the effect of the sympathetic reflex, while the contractions of the levator ani and the external sphincter

muscles is due to the spinal reflex. The pain is due to the pinching of the exposed nerves within the anal canal.

All nerve irritation in anorectal disease can be traced to stimulation either of the spinal or the sympathetic system of nerves, or to a combination of these two systems. The anatomical relation between these two systems of nerves is so intimate that we are often unable to draw any hard and fast line, and to say whether such reflexes occur through one system alone, or through both. Broadly speaking, the spinal factor in sensation is represented in all areas where non-painful stimuli can be recognized and localized by the patient. On the other hand, sympathetic irritation produces contractions either of involuntary or of voluntary muscles, with pains referred to points, distant from the site of irritation, where spinal nerves exist, and also produces alterations in secretion. The patient himself cannot locate the point of stimulation, but can only recognize the referred pain in its spinal distribution.

In any analysis of symptoms produced by disturbances or by stimulation of the visceral innervation, the question as to whether any of the sensations may be regarded as specifically painful in type, is of some importance. If pain be regarded as an entity, due to stimulation of special nerves or nerve-endings of spinal origin, then the assumption is permissible that pain, *per se*, is not a part of the symptom complex of visceral disturbances. If pain be considered as the result of excessive stimulation of any nerves carrying impulses of sensory type, other than a specific form of sensation, then we must admit that there may be such a symptom as true visceral pain. While these views, as yet, have not been settled to the entire satisfaction of the physiologist or the psychologist, the evidence is strongly in favor of the existence of a specific sensation of pain. So far as we are able to observe, visceral sensations are poorly localized subjectively, are more or less diffuse in distribution, and may be described best as sensory compounds, or as generalized organic sensations. It is the relationship that these sensations bear to each other, and to the body in general, that contribute to our feeling of well-being or of illness, of pleasure or of distress. Nausea, with its reflex symptom of vomiting, thirst, suffocation and generalized vasomotor and secretory disturbances, evidenced in collapse and sweating, may be taken as types of visceral sensation. Under spinal, or local cutaneous anesthesia, rough handling of the bowel or undue traction on the mesentery, may produce any of the above symptoms, but no sensation that closely resembles the intense, sharply localized pain of cutaneous origin. In other words, these visceral sensations produce more mental perturbation and a general feeling of discomfort, rather than local suffering or pain. Whether unpleasant visceral sensations

ever become so intense as to produce specific pain, is a matter for future investigation, but, certain it is, that this generalized visceral discomfort, this so-called visceral pain, has characteristics materially different from pain of peripheral distribution.

The statement has been made that the rectum and colon are painful to the touch, or palpation, when they are inflamed. This is an error. Ulcers above the anorectal line simply produce tenesmus and a constant desire for stool, but no painful sensations that can be localized. Perirectal suppurations cause pain only when they involve tissue in the neighborhood of the levator ani muscles, the pelvic walls, the lining of the anus or the external sphincter. Inflammations extending to the voluntary muscles lining the pelvis may produce reflex symptoms, which may be painful. Carcinoma of the rectum produces no localized pain unless it involves these same structures. Ulcers of the rectum, above the anorectal line, may be cauterized with the actual cautery without causing pain. Sensations of heat and cold, as such, are absent in the rectum, except where these stimuli come in contact with the spinal innervation at the anorectal line. It must be remembered, though, that heat and cold do produce vasomotor changes, and stimulation and inhibition of muscular action.

In cases of anal pruritus itching is felt only in the perianal skin, and in the skin lining the anus, up to the dentate border. This we would expect, as itching is caused by irritation of the nerves carrying tactile sensations and not by nerves responding to pressure or to painful stimuli. It has been noted that local anesthetics may be applied to the anal and perianal skin, rendering it anesthetic to painful impressions, and yet the pruritus not be relieved. It is for this reason that such drugs as carbolic acid and its derivatives, menthol, thymol, and camphor, which cause upon local application, marked disturbances in tactile sensations, have become our mainstay in treating these cases. Cold and heat, the X-ray, the high frequency current, and the violet-ray are effective for the same reason. In addition to allaying the itching, some of these are more or less antiseptic in their action, and aid in lessening local infection, if this exists.

Formication, or crawling sensations, so frequently noted in anal pruritus, are likewise caused by irritation of the nerves of touch. It is possible that another element largely enters into this peculiar reflex. This modification of the sensation of itching may be due to irritation of the nerves conveying sensations of pressure, ending in the Pacinian corpuscles.

Localized, perianal sweating is a reflex noted in cases of pruritus, frequently just preceding an attack of itching. It is possible that the

presence of the perspiration on the perianal skin starts the itching. Sweating has also been noted under the influence of excitement and at times when the rectum is overloaded with feces. In the last instance the sweating occurs just before or at the time of stool. In pruritus, the sweating must not be confused with the serous exudate so often present where we have an associated anal eczema. Sweating is a sympathetic reflex of the secretory type.

Sensations of dryness and of moisture are felt only by the anal and perianal skin. To the patient, apparently they are in the rectum when conditions producing these sensations involve the floor of the rectal ampulla, where the anal papillæ are placed.

Persistent vomiting was noted in a case of fecal impaction. This was relieved when the rectum was emptied. I would consider this phenomenon a visceral reflex, due to the pressure of the gas and feces upon the walls of the rectum and colon. Also, any large quantity of feces or gas in the colon, may press directly upon the walls of the stomach or upon its nerve supply, thus producing nausea and vomiting.

The rectum, because of its anatomical conformation and its peculiarly active function, tends to become congested. Because of this circulatory stasis and the constant presence of infective bacteria, a low degree of neuritis or of nerve irritation is sometimes produced. Long standing inflammation and infection may result in permanent changes in the nerve endings and symptoms may be multiplied indefinitely.

Motor disturbances, the result of nerve irritation, are of constant occurrence in anorectal disease. Thus we may have increased muscular irritability, occasionally associated with muscular hypertrophy, due to the constant irritation from a fissure, from a cryptitis, or from a rectal ulceration. The rectal crypts, situated as they are, just under the free border of the semilunar valves of Morgagni, and in close apposition to the anal papillæ, namely on the extremely sensitive anorectal line or dentate border, produce, in a pathologic condition, innumerable disturbances in spinal sensation and in motor function. Indeed, a cryptitis may not be without its mental manifestations, as frequently there is noted mental exhaustion, associated with extreme emotional irritability and irascibility. Constipation due to muscle spasm and excessive inhibition is frequently noted in these cases.

Sphincteric irritability is frequently observed in rheumatic and gouty patients. In these cases there is probably a myositis associated with circulatory congestion and a diminution of secretion from the mucosa.

At times, a digital examination of the sphincters shows nothing abnormal. If the patient be allowed to lie still for a few minutes, a second examination will show a sphincter in extreme spasm. This latent irritability is a reflex, often without demonstrable causative lesion, which will sometimes account for vague symptoms of pain and uneasiness, to be accounted for in no other way, the sensations being due to muscular contractions.

Undue sphincteric contractions may produce profound systemic or mental phenomena. Where there is a hypersensibility of the sphincters, a patient may suffer from extreme nervous collapse after stool. This is not uncommon in cases suffering from anal fissure, cryptitis or from rectal ulceration. This prostration may or may not be accompanied by pain, depending upon whether the lesion causes irritation of areas supplied with nerves carrying painful sensations or whether the lesion lies wholly within the rectal cavity.

Excessive sphincteric development frequently is associated with anal hyperesthesia. On the other hand, instead of painful or unpleasant nervous phenomena, an opposite condition may obtain. There seems to be little room for doubt that, in some of these cases, the mental impression is somewhat sexual in type. These patients often note a feeling of well-being and of exhilaration after the passage of a large, well-formed stool associated, at times, with a condition of mild priapism. Indeed mental pictures, essentially sexual in type, may occur under this condition. This pleasurable, sexual sensation in hyperesthetic and neuropathic individuals may account for a few of the cases observed of rectal masturbation and of passive pederasty.

With the patient under the influence of an anesthetic, a divulsion of the anal sphincters has been observed to stimulate respiration, and even has been resorted to to stimulate the muscular action of the heart, when it has been arrested temporarily by the action of the anesthetic. Frequently I have had patients under ether narcosis, so rigid that operation was impossible. Upon divulsing the sphincters, the patient would take two or three deep inspirations and then become perfectly relaxed. As a precaution against an overdose of the anesthetic, my anesthetist always withdraws the ether or chloroform while the sphincters are being divulsed. This being the case, the relaxation is not due to any added anesthetic, but to some obscure nerve impression produced by the traumatism of divulsion. Many writers have noted that patients requiring rectal operations are not only hard cases to anesthetize, but also that they require to be carried deeply under the influence of the anesthetic before any manipulation can be performed with comfort to the operator. A divulsion performed at the

proper moment may materially lessen the amount of ether employed to obtain relaxation.

In some instances the manipulation of the sphincter muscles, necessary in making rectal examinations, is followed by profound nervous depression and even collapse. This is apparently more noticeable in persons of a highly nervous temperament or who have excessively developed sphincters. It seems to occur more frequently in the male sex, due probably to the relatively greater muscular development.

Some writers have used the term rectophobia to describe a condition of morbid foreboding, claimed to be peculiar to patients afflicted with rectal disease. A distinction must be drawn between rectophobia, a distinctly psychic condition, and rectal neurasthenia, which is a physical entity. There seems to be little room for doubt that anorectal lesions exercise, in certain cases, some obscure influence over the mental processes of the patient. Such mental disturbances are apt to develop in patients having a marked nervous taint. These individuals may become morose and melancholy, and obsessed with a feeling of dread as to the possible results of their rectal malady. Rectal neurasthenia on the other hand, does not seem to alter the mental attitude of the patients so much as it affects their feeling of well-being or nerve tone. In other words, there is little tendency toward introspection, the patient merely feeling physically subnormal. Clinically, the condition is difficult to diagnose, but is often recognized after a successful rectal operation, or treatment, by the great change in the patient's general feeling of health. The sense of physical depression is lost and a patient will say that he feels like another person. This beneficent change in subjective feelings is often associated with a marked increase in weight and an improvement in general health. Rectal neurasthenia is caused by lesions of the anorectal region producing a more or less constant irritation of the visceral nerve supply. As the same type of nerve disturbance is produced by pathologic conditions of the abdominal and pelvic viscera, an accurate means of making a differential diagnosis as to the organ or structure producing the neurasthenic condition is much needed.

The muscle tone of the sphincters may vary according to the special needs of the individual. After divulsion of the sphincters for the relief of a fissure or of anorectal ulceration, the internal muscle, assisted by the voluntary contraction of the glutei and the levator ani muscles, frequently does the work of both of the sphincters and will be found in a state of tonic contraction, as though somewhat under the influence of the will, due to the influence of the voluntary control of the glutei and the levator ani muscles. In cases of stricture, tumor

and intussusception of the rectum, not involving the lower sensory area, the absence of feces in the lower bowel is often associated with a patulous condition of the sphincters. Relief of the obstruction or irritation, from whatever cause, at times is followed by almost complete return of function in the sphincters. The presence of feces, a foreign body in the rectum, or of any other form of irritation, normally would be followed by a reflex relaxation of both of the anal sphincters, were it not for the voluntary control over the striated sphincters and accessory muscles of defecation. In the process of normal defecation the sphincters are not relaxed voluntarily. The cerebral inhibitory impulses are simply held in abeyance, while both of the sphincters are allowed to dilate reflexly and automatically. This is associated with reflex, or automatic, contraction of the muscular coats of the rectum and with voluntary contraction of the accessory muscles of defecation. I have observed several cases, in which the internal sphincter was firmly contracted, due to rectal irritation. This contraction was associated with a relaxed or patulous condition of the external sphincter. After divulsion of the internal sphincter and correction of the rectal lesions, I have observed the external sphincter to resume its normal function of contractility. This condition I would call *compensatory relaxation* of the sphincter, due to a physiologic absence of any necessity for contraction. In some cases this relaxation may have been caused by inflammatory changes existing in the sphincteric nerve supply, or in the muscle itself, which recovered their normal function after removing the source of irritation or of infection.

Alfred J. Zobel, in discussing patulous conditions of the anus says, "In the normal individual, the anal canal is held closed tightly by the tonic contraction of its sphincter muscles. In certain individuals, however, we observe that when the buttocks are drawn apart there is more or less gaping of the anal orifice.

"This condition of patulous anus results from an abnormal loss of tone in the sphincter muscles, which may be due either to a fault intrinsically within the muscle, or to some disturbance in its nerve supply. When purely muscular, the cause may be a direct injury to the muscle; an infiltration by a malignant or a syphilitic growth; a participation in a general muscular weakness; or to the presence of a foreign body in the rectum which prevents the muscle from completely contracting. When the nerve supply of the sphincters is at fault, the causative lesion may be either central or peripheral."

While pathologic conditions causing peripheral nerve disturbances produce many changes in the tonicity of the sphincters, diseases of the central nervous system have even a more marked influence upon

the rectal and anal reflexes, and upon the motor and sensory nerve impulses.

Allingham states that "in the beginning of mania one often observes that the patient has severe pains in the rectum without any pathologic condition to account for the same." These pains probably are forms of rectal crises, such as we meet with in cases of locomotor ataxia.

The existence of true hysterical pains in the rectum has been a matter for much discussion. Earle quotes Dr. Wm. Goodell as saying, in substance, that "few muscles of the body are exempt from attacks of hysteria" and that "the circular muscles are more liable to attacks." At the same time most of the authorities in proctology seem to be in accord with the statement made by Mathews that, "Recognizing today the power and the manner of the reflexes, we had better say that we can have a diseased condition, simulating hysteria, caused by disease or an irritability of the periphery of the nerve."

True neuralgia of the rectum has been denied, but Allingham states, "I can see no reason why neuralgia should not sometimes attack the rectum as well as any other part of the body." Ball states that sciatic neuralgia may be due solely to the pressure of an over-distended rectum. Pain in the sciatic distribution is better explained on the basis of a sensory reflex due to cord association of the nerve tracts. In almost every case of so-called neuralgia of the rectum, a careful search has revealed some local pathologic lesion to account for the pain, such as a fissure, a cryptitis or some slight anorectal ulceration, which starts the reflex symptoms.

Diseased conditions of the spinal cord, which interfere with the transmission of motor and sensory impulses may cause disturbances of the rectal functions.

RECTAL MANIFESTATIONS OF DISEASES OF THE CENTRAL NERVOUS SYSTEM.

A few years ago, I reported a series of cases of locomotor ataxia and of paretic ataxia. I shall take the liberty of quoting freely from this and from another paper upon the same subject.

In *tabes dorsalis* the degenerations occurring in the posterior nerve roots and in the posterior columns of the spinal cord, must, necessarily, cause great disturbances in functions. These disturbances are particularly noticeable where the complete co-ordination depends upon a perfect balance of the motor, sensory and reflex phenomena. Such complicated mechanisms as those for micturition and for defeca-

tion show signs of any nerve degeneration very early in the course of the disease.

Among the early rectal symptoms of locomotor ataxia may be mentioned constipation, paroxysmal attacks of pain in the rectum (rectal crises), lessened myotatic irritability of the anal sphincters, and disturbances in sensation of the anal skin and of muscle sense of the anal and rectal musculature. We may also have a more or less complete loss of the voluntary or of the reflex control of the bowels.



Fig. 179.—Showing relaxation of the anal canal when digital pressure is made within the anal canal. Age of patient, 34 years. Note similarity to Fig. 180.

Digital examination of the tabetic cases showed, in each, a sensory paralysis of the external sphincter. When the finger was introduced into the rectum and firm pressure, in a lateral direction, was made upon the internal sphincter, the anus could be made to relax to such an extent that a good view could be had of the lower rectum without the use of a speculum. This phenomenon appeared to be due to the fact that when the internal sphincter was dilated by pressure, there was no reflex contraction of the external sphincter which, under ordinary circumstances, would contract firmly about the finger, cutting off any view of the lower rectum. However, considerable power seemed to remain in the sphincter.

In 3 cases of tabes another peculiarity was noted, which was that when the finger was withdrawn, the anus did not immediately contract, but remained patulous. This appeared to be due to the loss of muscle sense, the patient being unaware that the sphincters were relaxed. In a short time, however, the internal sphincter closed involuntarily and reflexly, and the anus was pulled back to a fairly normal position by the contraction of the levator ani muscles. While the anus at rest is not tightly contracted, but the surfaces of the anal canal are simply maintained in a state of delicate apposition, painful



Fig. 180.—Case of tabes in the service of Dr. Wm. G. Spiller, at the Philadelphia General Hospital, showing a patulous condition of the anus. Age of patient, 55 years.

impressions may cause marked temporary spasm of the sphincters. This spasm seems of the nature of the exaggerated muscular contraction noted in cases where there is a loss of the power of co-ordination: 24 of the 28 cases examined having paresis, also showed similar symptoms to the tabetics, especially as to loss of muscle sense in the sphincters. In the tabetic cases there was also found anesthesia of the anal skin.

A condition which easily may be mistaken for a sphincteric paralysis of central origin, is where there is a deficient development of the sphincters and of the muscular and fascial supports of the rectum, with a resulting procidentia recti. Pressure on the sphincters

in these cases will give the same view of the lower rectum, but the rhythmic contractions of the normal sphincter can usually be felt. In tabetic cases this rhythmic sphincteric contraction is usually absent. This absence of contraction is apparently caused by a lessened myotatic irritability, associated with a sensory paralysis, more or less pronounced, involving the cutaneous margin of the anus. There is also a marked diminution in muscle and pressure sense of the rectum. In paresis this condition is more marked in those cases presenting ataxic symptoms.



Fig. 181.—Same as Fig. 179. After the finger is withdrawn, the anal canal remains patulous for several minutes. Compare with Fig. 183.

In cases with lessened sphincter tone the anus often appears funnel-shaped, due to the relaxation of the external sphincter, associated with a firm, compensatory contraction of the internal muscle. At the same time, the cutaneous margin of the anus is devoid of the radiating folds usually seen in the normal subject, thereby simulating that condition which Tardieu ascribes to the practice of passive pederasty. The anal skin is often redundant and baggy, simulating the appearance noted in cases procidentia recti. Indeed, there may be associated a condition of partial prolapse of the anal skin and of the rectal mucosa, combined with such extreme hypertrophy of the skin as to resemble the labia minora of the female.

In many cases of ataxia, the other symptoms were associated with frequent attacks of agonizing pain in the rectum, probably examples of rectal crises. These attacks of pain come on suddenly, without warning, and last from a few minutes to hours, disappearing suddenly and completely. After the pain ceases there is at times a feeling of exhaustion, which may persist for some time. The time of these attacks does not appear to hold any relationship to the condition of the rectum, whether it is full or empty, or whether before or after



Fig. 182.—Same as Fig. 181. Speculum introduced ten minutes after first examination, showing how extremely patulous the anal canal remains.

stool, and the expulsion of flatus brings no relief from this distressing symptom. The symptoms of these crises are believed to be due to the pathologic process of tabes involving the ganglion cells on the posterior nerve roots of the spinal cord. Patients often complain of a feeling of fullness and weight in the rectum, as if the bowels should be evacuated, but attempts at stool give neither a passage nor relief from this feeling. Few of my patients showed any lesion of the anus or rectum. No fissures nor hemorrhoids were discernable. One case had a small fibroid internal pile which was removed without any symptomatic relief. On the other hand, because of the sensory paralysis, extensive anorectal lesions may produce neither marked pain nor discomfort to the patient.

Clinical observations in patients with lesions of the spinal cord, confirm the results obtained by experimental research. Nearly every patient with locomotor ataxia and paretic ataxia, suffers from obstinate constipation. The same may be true of many other spinal lesions. The *compensatory*, or as Sahli expresses it, "the vicarious" contraction of the internal sphincter, associated with a lessened degree of peristalsis and of abdominal tension, accentuates any existing constipation. The anesthesia of the anal skin and the loss of muscle sense in the



Fig. 183.—Same as Fig. 182. Showing compensatory contraction of anal aperture in case of locomotor ataxia before digital examination.

rectum and anus rob the patient of any desire to go to stool, which a full rectum would otherwise render imperative. As the rectum becomes more and more distended the patient must go to the toilet so soon as he has any knowledge that his bowels need evacuating, otherwise he is likely to have a complete movement, with no voluntary control. In the more advanced cases we may expect this periodic incontinence to become pronounced. In examining these patients we frequently find the perineal region and the underwear soiled with mucus and feces, caused by the gradual leakage which is unnoticed by the patient. This will occur even though the patient is complaining of severe constipation, producing an anomalous condition of *constipation*

with incontinence. This incontinence is of much the same type as that condition of the bladder which we classify as "paradoxical incontinence." It may be so pronounced that a complete bowel movement may take place before the patient is aware of the fact that he has a stool in his rectum.

As the rectal and vesical symptoms come on early in the course of tabes, a paralyzed external sphincter, with a history of persistent constipation, associated with vague or severe pains in the rectum, and a loss of the anal reflex, should suggest to the examiner the necessity for testing the other reflexes of the patient. The addition of disturbances of the bladder and of the sexual powers may be considered very suggestive of changes taking place in the spinal cord, interfering with the transmission of sensory impulses to the brain. The disturbances of the other reflexes, such as the loss of knee-jerk, poor station, impaired pupillary reflexes, etc., will frequently point to a diagnosis.

In acute transverse myelitis the motor functions are rapidly lost and the bladder and the rectum are paralyzed. The reflexes may be lost but this may be followed by spastic rigidity. At first we have retention of urine, later to be followed by incontinence. The patients are extremely constipated, but have incontinence by reason of the associated motor paralysis, and the establishment of periodic automatic evacuation.

In acute ascending paralysis (Landry's), in spite of a rapidly advancing motor paralysis, there is rarely any symptomatic involvement of the sphincters, as the sensory impulses remain intact. This may be explained by the fact that this disease is at present considered in the nature of a multiple neuritis, and the sympathetic functions escape.

In spastic paraplegia or lateral sclerosis, where we have muscular rigidity, spasticity and increased reflexes, unassociated with muscular wasting, the sphincters are only occasionally involved. As a rule, the sphincteric paralysis comes on late in the course of this disease, but it may appear early. In a case recently examined, of posterolateral sclerosis, the symptoms were those of a pronounced ataxia of the upper extremity, associated with spasticity, muscular rigidity, increased reflexes, and ataxia of the lower extremities. The patellar reflexes were exaggerated. Both patellar and ankle clonus were pronounced and the Babinski reflex was present. This patient had some difficulty in starting his urinary stream. He had anesthesia of the bladder and urethral walls, being unable to tell when he was through urinating except by watching the stream. Anesthesia of the bladder and rectal mucosa refers to the loss of pressure and muscle sense and

not to pain or tactile sensations, for the latter are absent in these localities. While quite constipated, he had *imperative incontinence*, having to go to the toilet immediately that he was aware that his bowels needed evacuating. Because of this condition he frequently had involuntary stools. Digital examination showed a slightly patulous condition of the anus, which can easily be dilated by pressure. With the finger in the rectum, pinching of the muscles is followed by reflex contraction. To the touch, the sphincter, while not contracting firmly, seems spastic. The paralysis in this case seems sensory more than motor, and the reflexes seem partially preserved. As the reflex arc is not broken as in *tabes* we have preservation of muscle tone and of the reflexes. The posterior cord degeneration interrupted the transmission of conscious sensation from the rectum, accounting for the symptom of unconscious evacuation.

Multiple sclerosis presents such varying symptoms, influenced as they are by the location of the lesions, that there is little uniformity in the sphincteric conditions. Spasticity of the muscles, with muscle tremors and disturbances in co-ordination are usually present. Pares-thesias and anesthetics are marked. Disorders of the vesical and rectal functions are of common occurrence. One case that I examined showed an almost complete motor paralysis, associated with marked constipation and retention of feces. In this case there seemed to be a marked inability of the rectal musculature to rid itself of the retained feces, the rectum being filled, at the time of examination, with a large, firm mass of feces, which gave apparently no discomfort. There was a motor paralysis of the sphincters, at least for volitional contraction, with apparent anesthesia of the rectal mucosa, although the sphincters seemed to have left some power of reflex contraction.

According to Sahli, "Unilateral cerebral lesions do not affect the vesical and rectal functions unless the lesion is of the medulla or pons. Here, on account of the proximity of the bilateral tracts, the results are like those produced by lesions of the spinal cord.

"Bilateral cerebral lesions, on the contrary, may lead to disturbances in the bladder (and rectal) function, especially if they are diffused. This is because the bladder (and rectal) tracts are not arranged in the brain compactly in a bundle, but seem spread out diffusely. These disturbances are ordinarily associated with disturbances in consciousness. An unconscious person allows his urine (or feces) to escape because he has no will-power and no sensation. He is obliged to trust everything to the reflexes. The bladder (or rectal) reflex may be entirely unaffected, so that from time to time the bladder (or rectum) is emptied quite normally, even though unconsciously and involuntarily."

The treatment of symptoms due to reflex disturbances and to lesions of the nervous system narrows itself down to the diagnosis of the cause of the disturbance, and the removal of the cause resulting in symptomatic relief.

Pain as an anorectal symptom, aside from that due to acute inflammation or suppuration, is often directly proportionate to the amount of sphincter spasm produced by the lesion. Relief is obtained in these cases either by removing the source of irritation or adopting some procedure to eliminate the sphincter spasm. An example of anorectal pain is seen in patients suffering with anal fissure. Local treatment of the ulcer, resulting in healing, will be followed by cessation of the extreme muscular spasm and the relief from pain. On the other hand, measures adopted to relieve the sphincter spasm, by lessening the pressure upon the exposed and irritated nerve-endings, and by causing an improvement in the anorectal circulation, give immediate relief from the pain. Unless the fissure is complicated by the presence of a fistulous tract or an irritating polypoid mass of inflammatory tissue, or has unduely indurated edges, it will usually heal with little treatment. Relief from sphincter spasm is best obtained by divulsion of the sphincters or by a division of the fibers of the external sphincter through its right or left posterior quadrant. A detailed discussion of the treatment of the special lesions causing sphincteric irritability will be found in other chapters in this book.

The alterations in sphincter tone produced by cerebrospinal lesions, while interesting from a diagnostic standpoint, offer little scope for any special form of treatment. Where the cerebrospinal lesions are curable, a return of the normal sphincteric tone is to be expected. Where permanent nerve changes and degenerations are present, treatment is futile. The rectal crises of ataxia, not being due to local rectal conditions, will not be relieved either by divulsion or by division of the sphincters. Should either of these operations be performed upon a patient with an unrecognized cerebrospinal lesion, and should incontinence follow, the surgeon may be blamed, unjustly, for having produced a condition which is the direct result of disease. The medicolegal aspect of these cases is of extreme importance.

By far the most important symptom occurring in cases of central nerve disease, from the proctologic standpoint, is constipation. This constipation is caused by alterations in the visceral nerve supply, producing disturbances of the sensory, motor and secretory functions. Laxatives, massage and electrical stimulation are of great value in treating this condition. Eternal vigilance is required to prevent serious attacks of fecal impaction in these patients.

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CHAPTER XXVII.

Relation of Rectal Diseases to the General Health.

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It is not the purpose in this brief chapter to in any way magnify or unduly estimate the importance of rectal diseases as they relate to the general health. On the contrary, the object is to present the subject in its full light with no more weight attached to it than the facts warrant. If this subject could be appreciated in a general way the relief to many sufferers would be amazing, and in some instances incredible.

There are several reasons why rectal diseases are so poorly understood and patients so universally hesitate to seek professional advice. The first is that the subject is almost wholly ignored at the time students are receiving their medical education. It could not be otherwise than that little interest would be aroused in the investigation of rectal diseases after a professional career had been entered upon, since all previous energies had been directed along other avenues.

The second reason is that no other portion of the human body within easy access is so difficult to approach as the rectum.

The third is that the patient is timid, and the physician who has but little knowledge or interest in such affections inspires no confidence in his ability to give relief.

Fourth, a great many rectal diseases are of a chronic nature and not of themselves fatal to life. When the patient is thus advised he feels that he has a big asset in his favor for further endurance of his present condition.

The fifth is that all patients have great fear of losing control of the bowel, if an operation is being considered. They all know or have heard of a number of such unfortunates.

In the foregoing excuses can be found the cause for rectal cancer reaching a fatal stage before the patient is conscious of his awful condition. All other rectal diseases are ignored in a similar manner. There is scarcely a rectal disease, which, if allowed to continue its

course, will not influence the general nutrition. It is to this feature that I wish to call attention, and will do so by referring to a number of cases that have come under my observation.

Hemorrhoids occur more frequently than any other rectal lesion, and when they are of sufficient importance to attract attention and have existed for a considerable period of time, the general health is most certain to be influenced to a greater or less degree.

There are three types of hemorrhoids that materially influence the general health, and it is usually for one of these conditions that the patient seeks the physician's aid. The *first* is the bleeding variety of piles. Hemorrhage is the chief symptom of which the patients complain. Such individuals become very anemic, exhausted, and in a state of "broken-down health." All these patients have taken various blood tonics, and have resorted to other measures whereby their condition might be improved. Since the bleeding, which is the cause of the anemic condition, is not relieved, there is but little benefit derived from tonics, etc. I have known a number of instances where patients have become very anemic as a result of hemorrhages when the bowels acted, though they were entirely ignorant of the fact that they were losing blood. I once operated upon a patient who was very anemic and had been for two years. His physician told me that he had given him all the remedies he knew for anemia with no results, when it was observed that he had a small hemorrhage every morning while at the toilet which had not been discovered.

Six months ago I operated upon a physician who was almost exsanguinated. He had been losing blood from the rectum for more than twelve months, and had become so completely exhausted that he was forced to give up his practice. Although he was a physician, it was with the greatest difficulty that his brother persuaded him to submit to an operation. He remained in the hospital one week when he returned home and resumed his practice. Two months later he was a perfect specimen of physical health.

It is not at all infrequent that we meet with just such cases as I have referred to, and under the proper general treatment after operation they rapidly regain their normal health.

The *second type* of piles that materially affect the health is the variety that is in a state of extreme irritation. The tumors are usually large, angry and prolapse on defecation. They have to be replaced with the aid of the hand, and after the stool is completed the patient is exhausted; no relief from suffering is possible for from a half to three or more hours. The sphincter muscles are hypertrophied to three or four times their natural size, and contract with such force upon the

diseased anal tissues that the patient is completely overcome by pain. In these tumors numerous thrombi are present, every one of which acts as a foreign body, thus aggravating spasmodic contraction of the anal muscles. As I have said, this type of hemorrhoids profoundly influences the individual's health. Constipation with all its evil consequences is present. Indigestion, flatulency and headache are often prominent. The patient is nervous, impatient and often depressed, but the most conspicuous symptoms are pain and irritability due to the peculiar type of suffering. I can recall many cases of this variety we have had under observation. One of the most notable was a lady who had suffered from this form of hemorrhoids for a number of years. When she came to us we were in no little doubt as to the advisability of operating, since she showed distinct evidence of mental derangement. The question was discussed with her husband and his wishes were that the operation should be done. He stated that she had been found unconscious a number of times just after an action from her bowels. After the operation she recovered with an average degree of rapidity and went home about the usual time after such operations. We had letters occasionally for five or six months, which said she had gained her normal weight and was well in every respect.

In the *third variety* of hemorrhoids we find very large prolapsing tumors that are free from inflammation. They occur as a result of relaxation of all the tissues in the hemorrhoidal area, including the anal muscles. The patients complain very little of pain except that there may be an uneasiness about the rectum that cannot be easily described. Rarely, there may be a heavy, aching sensation in the sacrum and some difficulty in urination. The greatest annoyance comes from the tendency to a constant prolapse. There is such a general relaxation of the parts that straining at stool, physical exertion, remaining in the erect posture, or fatigue will result in complete or partial prolapse. In this condition it is considered that the patient is in no way affected except there may be some inconvenience due to the protrusion. Such individuals are advised to have operations with the view only of getting relief from the annoyance of a more or less complete prolapse of pile tissue, there being no apparent thought or expectation of improvement in a general way. I could cite numerous instances belonging to this class that have come under my observation, but will only refer briefly to two cases.

The first was a man from a neighboring town who was a mail carrier. He was tall, thin and rather poorly nourished. He complained of a partial protrusion at all times while performing his daily duties. When straining at stool or otherwise a very large mass protruded and

could be returned only by the aid of his hands. He had no pain, no bleeding or discomfort except that of a prolapse. I removed the protruding mass, which, of course, included the entire pile-bearing zone. The patient had an easy convalescence and returned to his home in ten days. I had two letters from him in two months, in which he said that he was completely relieved. For more than a year I had not heard from him when I received a letter saying that he had improved so much in his general health that he thought I would be interested and glad to have this news from him. He had perfect digestion, bowels regular and all uneasiness about the rectum was relieved. The peculiar kind of nervousness that is so frequently complained of in these cases had entirely disappeared, and his weight had increased thirty pounds. This patient was operated upon with the hope of getting relief from an annoying mechanical condition. It had not occurred to him that the constant presence of a prolapse had affected him otherwise than locally. It has been the observation of both Dr. Mathews and myself that all cases affected as this patient was improve in a general way when they have been relieved of the prolapsing tumors.

The second case that I shall refer to is one of unusual interest and is associated with so many complicating features that I will detail only the most prominent points. The patient was 62 years of age, had led an active life, but had not always been vigilant in the preservation of his health. He had been afflicted with large hemorrhoids for more than forty years. They had caused very little pain and had bled small amounts in their early history. The patient, since a youth, had been very nervous. When I first saw him he was very much depressed and said he was in a hopeless condition. He had a coated tongue, poor appetite, pronounced insomnia and melancholia. He was so nervous that it was impossible for him to remain in a chair for more than a few minutes at a time. He was constipated and had no relish or taste for food. He complained of various unnatural sensations which he thought would soon result in death. Examination showed one of the largest prolapsing masses of piles I have ever seen. There was very slight disposition to protrusion except when at stool and the mass was returned by the aid of his hands. His blood count showed the red cells 3,600,000, hemoglobin 60 per cent., with a diminished amount of urine. His physician urged an operation. I could not believe such a procedure was the proper course to pursue. I thought there were other factors in the case that needed attention more urgently than the piles. His physician argued that this man had been under his observation and treatment for more than four years and it was his opinion that the hemorrhoids were the chief source of trouble. Still disinclined to the advisability of operating, I

laid the case before Dr. Mathews, and asked his opinion, since his experience in the treatment of these diseases had been extensive. After hearing the history and knowing the wishes of the doctor in the case, who is a man of excellent judgment, he advised an operation on the grounds that we would have but little to risk and a chance to gain a great deal. The patient protested vehemently against the operation. Though he yielded to the advice of his doctors, he felt that it would all end in disaster. The operation was performed, and it is not possible to relate correctly the awful experience we had with the patient for more than three weeks. His periods of nervous excitement, profound despondency, unnatural sensations, insomnia, anorexia, etc., reigned supreme. Every day that passed for more than three weeks filled me with regrets that I did not follow my first inclinations and refuse to the end to operate. Everything was done that could be thought of to aid in his convalescence, and after three weeks had elapsed it was thought at times that there was perceptible improvement, but relapses soon dispelled every sign of substantial gain. At the end of six weeks he went home. At this time there were positive signs of improvement and I was greatly encouraged. He came to see me every week for a month and then I did not see him again for five weeks. When he came to my office I could hardly believe he was my former patient. He was bright and cheerful; was eating and sleeping much better. His melancholia was fast disappearing and his weight had increased twenty-five pounds; blood analysis showed red blood-cells 4,800,000 and hemoglobin 80 per cent. (March 10, 1913).

While the patient is not yet in a state of normal health, I feel that it is not violating reasonable expectation to express my confidence in his complete recovery. I neglected to state that the patient thoroughly understood that the operation was to relieve the annoyance of the prolapsing tumors, with the hope and not the assurance of improvement in his general condition. While this was an unusual case in many respects, it was no more so than many others that have been observed by those engaged in treating similar conditions.

I have referred to three particular types of hemorrhoids only; but it should be understood that they merge from one into the other till every form of hemorrhoidal tumor is included, and they all depress in some mysterious way the vital functions of almost every individual in whom they occur.

It is not the intention in this discussion to call attention to theories that may or may not explain various phenomena in these cases, but, on the contrary, it is my purpose to emphasize as much as can be the good that may be done by properly treating those who are thus affected.

There are few patients who are cured by operation for rectal fistulæ that do not improve in some measure in the state of their general health.

There are three types of rectal fistulæ that especially affect the general nutrition. The *first* is seen in those cases where there are large pockets with active suppuration and poor drainage. The opening through which the pus finds its exit often closes and thus we have the symptoms of a new abscess. The number of recurrences in such cases may be indefinite. As an illustration of this type of fistula I will briefly detail the history of a case that came under my observation within the last year. Four months previous to the time when I saw him he developed a rectal abscess, from which time he had been a confirmed invalid. His weight was reduced from more than two hundred pounds to less than one hundred and fifty pounds. There was no external drainage, but two small openings were found in the anal canal. They would close every few days and the patient would have all the symptoms of an active abscess. He suffered with headaches, nausea, vomiting, and general exhaustion. In a few days after he was operated upon every symptom disappeared and he was soon regaining his lost weight. The absorption of pus, the pain due to imperfect drainage, and the diseased condition of the anal structures were the important factors in producing invalidism. In a few months after the patient returned home he wrote me that his normal weight was established and that he had never been in better health. In another case the patient had a very large rectal abscess and was operated upon, but not cured. Drainage continued and there was at no time any disposition to the formation of a new abscess. The patient persistently declined in health until it was thought that he possibly had a tubercular involvement, although no tubercle bacilli could be made out. After he had been seen by a number of consultants he was advised to go to another climate, which he did and there remained with an attendant for several months. There was no improvement. He returned to his home in the belief that his fistulous condition was tuberculous, and that there was little hope for his recovery. A few months later he came to Louisville for an opinion. He was operated upon, and now weighs more and is in better health than he has been for a number of years. This case is an illustration of the influence on the general health of a fistula in which drainage was constant but incomplete. This particular type of fistula is frequently met with.

The *second* variety of fistula is extraordinary in that it has the most profound influence on the general health of patients and at the same time they have very little discomfort about the rectum. Where there is slight pain in this region an examination reveals, as a rule, no

definite information. In such cases there is a very small pocket situated far enough from the anal muscles to cause no disturbance to them. Leading from this pocket is a minute sinus connecting it with the anal canal in its upper posterior aspect. The cavity produces pus in such small quantities and the drainage is so easy that little pressure is made, at least there is not enough to cause any great amount of pain. There is no moisture about the external anal opening. The small amount of pus drains into the rectum and is discharged with the fecal material. It is not difficult to see the ease with which one could overlook this condition. I have operated upon two of this type of cases within the last eighteen months. The health of one patient has been affected for four or five months. Intermittent fever, accelerated pulse rate, headaches, constipation, nausea, vomiting, loss of weight and extreme lassitude were the chief symptoms. Many doctors saw the patient from first to last and many diagnoses were made. When I saw her she complained of slight pain about the rectum, but could not definitely locate it nor could I find any evidence of fistula or abscess. When she returned the next day the rectal symptoms were more pronounced and an induration could be felt to the left of the anus. She went to the hospital and submitted to an operation the following day. Every symptom was immediately relieved and in a few weeks she was enjoying good health. The second patient I operated upon that belongs to this class of cases was much more affected in a general way than the one just reported. His health had been declining for three years. He had variations in temperature, rapid pulse rate; was thin and anemic; had a poor appetite and could eat but few articles of food. He was operated upon and in a few weeks he had regained his health.

The *third* variety of fistula that particularly affects the general health is the tuberculous type. This form of fistula is often an early manifestation of tuberculosis and no patients respond more beautifully to treatment when it is properly conducted. Every surgeon has seen numerous cases of this type, and to report specific instances would be to repeat the experience of every one who has had even a limited amount of work in this specialty.

The diseased condition about the rectum that I wish now to direct special attention to is one whose influence upon the general health is extraordinary. This disease is seldom recognized except as a very trivial and unimportant condition. If there are no complicating factors present it is not considered of sufficient importance to require serious consideration. Notwithstanding the superficial light in which these affections are held, they are often of the greatest importance to those who are thus afflicted. The nature of the disease is that of an infected and degenerated

condition of the tissues lining the anal canal, or the structures resting upon the inner surface of the anal muscles.

The infection may have its origin in the upper half of the anal canal, at the embryological landmark indicating the union of proctodeum with the hindgut, or it may be the continuation of a diseased condition of the rectal mucosa into the anal structures. As long as the infection in the mucosa is above the internal anal orifice and away from the influence of anal contraction, little or no pain is experienced from the pathological state, but as soon as the anal structures become involved the highly sensitive nerves, here located, become affected also. These irritated nerves stimulate constant sphincteric contraction and the increased pressure on the diseased nerve filaments produces increased muscular contraction, so we see one condition augmenting the effects of the other; or, in other words, it is a typical illustration of a "vicious circle."

After a time the anal muscles become greatly hypertrophied, and, on account of their long-continued and increased contractile force, the structures embraced within their grasp become necrotic, the result of the infective process and the need of normal blood-supply. When the examining finger is introduced no disease, in many instances, can be detected except there may be a slightly roughened or granular condition along the posterior surface of the anal tissues. If one is not sufficiently familiar with these conditions to have in mind the definite pathology for which he is searching, the examining finger will be forced through the anal canal into the rectum and thus fail to recognize the disease that is present.

In fact, the diagnosis or the extent of disease in the anal tissues is not by any means made out by the presence or absence of this granular surface, but when taken with other symptoms it may aid us to arrive at a conclusion. I have seen patients with an extensively roughened or granular surface with much less marked symptoms than other cases where the anal surface approached a normal state. The chief reason for failure in recognizing this disease is in the fact that none of the ordinary pathological conditions found in this locality can be made out; therefore, further investigations and considerations are not to be considered, since they are not endorsed by the weight of authority.

A symptom that is of great value is the condition of the sphincter muscles. They may be in a most rigid state of contraction, closing the anal canal so tightly that the introduction of an ordinary syringe tip may cause most violent pain, or, as may occur in patients who have become exhausted and emaciated from long-continued suffering, the muscles fail to contract tightly and the index finger may be introduced to the second joint without pain, but further introduction finds the muscles rigid

and inelastic; the pain resulting from further introduction of the finger into the rectum is violent and sickening.

In order that this disease and its influence upon the general health may be more fully understood, I shall report a few cases that have come under my personal observation.

More than a year ago I was called by a physician to see his uncle. Upon our arrival at his hotel we found the patient in bed. He was thin, sallow, exhausted, nervous, and irritable. Aged 52 years, with no history of any importance except that he had been affected with constipation, flatulency, indigestion, nervousness and pain about the rectum for fifteen years. Eight years previously he had arranged to come to Louisville to consult Dr. Mathews for his rectal condition, but his plans failed and further efforts to have professional advice were abandoned. After hearing his symptoms I was impressed that the patient had some grave and obscure condition that was chiefly responsible for his symptoms and that, if any rectal disease was present, it played little or no part in the patient's present state of health. Since I was called to investigate the rectal conditions, I proceeded to do so in a general way. There were no evidences from the patient's account of his condition, nor from external appearances, of hemorrhoids, fissures, ulcers, fistulæ or any other local disease. Of course, he did complain of indefinite pain or uneasiness in the pelvic floor, region of the sacrum, hips and legs. When the finger was introduced he had but little discomfort and there was comparatively no resistance until the second joint passed into the canal. At the time when this stage of the divulsion was reached the sphincter muscles seemed to be composed of fibrous bands in which there were no elastic properties. The pain, when the muscles were dilated to this extent, was excruciating. He was completely overcome with exhaustion and, although the finger was introduced very gently, he said the cruelty to which he had been subjected was unparalleled. In addition to the muscular condition I have described, there was only a slightly roughened surface along the posterior anal wall. I became convinced after the examination that the rectal condition was an important factor in the patient's state of health, although I was still of the opinion that there were serious complications that had not been detected. I advised that no rectal operation should be done until further observations were made. The nephew, who was a careful observer, said that he had made thorough investigations from time to time, and that nothing of a definite nature could be made out in the case and that he was anxious to have an operation done if there were reasonable expectation of obtaining even partial relief. He was

taken to the hospital and prepared for an operation with the understanding that we believed he would be very much improved, but that no positive promises would be made. After he was completely relaxed under the anesthetic the anal muscles were slowly dilated, and as soon as the tissues were subjected to a mild degree of tension they gave way at a number of points, especially in the posterior anal surface. At this location the fibers of the sphincter muscles were well exposed. All the diseased tissue resting upon the anal muscles was removed and the patient put to bed. His convalescence was disgustingly tedious, so much so that I often regretted my acquaintance with the gentleman. He was feeble, irritable, nervous, sleepless and had no desire or relish for food. For two weeks he remained in this condition, after which time he began to improve. At the end of the fourth week he was able to go to his home out in the country. He reported in my office every two weeks for three months. His improvement was slow but persistent and continued for more than twelve months. Today he is hale and healthy, grateful and happy and wonders why he should have remained a semi-invalid for eight or ten years. He has a good appetite, digests his food well, has regained his former weight and also his cheerful disposition, his nerve tension has quieted down and altogether he is a new man.

It is my observation that in such cases as I have reported it requires from six to twelve or eighteen months for the patient to get relief from all his symptoms. One of the most interesting patients of this class I have ever seen was three years getting back his normal health. The blood analysis in the above case showed before operation 3,500,000 red blood-cells, 8000 white cells, and hemoglobin 65 per cent. The last analysis was made ten months after the operation and showed the red corpuscles and hemoglobin only slightly below normal.

Almost all patients who are diseased in this way are in an anemic state, some being profoundly affected. In the case reported we see a man reduced almost to a state of invalidism as a result of a diseased condition in the anal tissues. Medicines, health resorts, local applications and Christian science had all been faithfully tested, and under the influence of all the patient continued to steadily grow worse. He was censured for allowing himself to develop such an ugly disposition and it was believed by many of his friends that he had lapsed into his present state of health on account of failure to exercise his will-power. They thought his complaints were whims and that very little disease was present. It is almost universal that individuals are thus accused when they are highly nervous. No cause can be assigned, so

the conclusion is that the patient is nervous and cranky without a cause. Such injustice to sufferers is becoming less frequent as our advances in medical knowledge enable us to recognize new relations, new conditions and new causes.

The second case is that of a man 50 years of age upon whom I operated April 2, 1912. The history of this patient is one that is most interesting and instructive. Sometime in January, 1912, one of our leading stomach specialists asked me to see this patient with him. He had been affected with a chronic diarrhea for a number of years and it was thought that he possibly had amebic infection, since no treatment seemed to give any relief. When I saw the patient he had been confined to his room for several months. His general appearance showed that he was very ill. He was feeble, emaciated, sallow and anemic. He was in good health until eighteen years ago, when during that summer he had a sudden attack of diarrhea for which he knew no cause. He said the cramping and tenesmus were terrific. His family physician treated him for three years, but was never able to control the diarrhea except for short intervals. After the first year of his trouble he had an aching and uneasy sensation that appeared in his rectum. Fifteen years ago he consulted another physician, who advised divulsion of the anal muscles, which was done with but little relief. From this time he was treated by various doctors, but the gradual decline in his health was uninterrupted.

Upon examination of the rectum there was no external evidence of disease. When the first half of the index finger was introduced into the anal canal very little pain was experienced, but when the larger portion was introduced it caused a great deal of pain and the patient complained bitterly. No abnormal condition was detected except a rough, irregular surface on the posterior anal wall, which extended up for an inch or more along the rectal mucosa. The anal muscles were very much hypertrophied and rigid. The muscles were not tightly contracted, which condition accounted for the slight pain when the first portion of the finger was introduced. A small proctoscope was then introduced, which showed that there was no ulceration of the rectal mucosa, but that there was a well-defined catarrhal condition. In this emaciated and exhausted patient the sphincter muscles, under natural conditions, would have been very thin and elastic and nothing more than discomfort could have resulted from digital examination, but the contrary conditions were present. There was no pain about the rectum except an occasional drawing sensation about the anal opening. Since the examination revealed nothing unnatural about the rectum except the hypertrophied anal muscles and the

catarrhal state of the rectal mucous membrane, I gave no opinion as to the cause of the patient's condition nor did I suggest any kind of treatment. Six weeks had gone by since I had seen the patient when I met his doctor and inquired about him. He said his condition was growing more serious and he thought there was little hope for recovery. I suggested that under such circumstances an operation should be done. While I did not feel free from doubts as to the results, I felt that the patient should have the benefit of an effort in this direction, as there was no improvement from any other treatment that had been employed. The family was informed that an operation was thought to be advisable and in a few days the patient was in the hospital. He was in such a weak and feeble condition we arranged to do the operation as quickly as possible. Gas was given and the anal muscles were thoroughly dilated. I have never seen a case that so thoroughly demonstrated the inability of the examining finger to detect the extent of disease in the anal tissues when examinations are made without relaxation of the parts with a general anesthetic. The entire posterior and lateral anal structures, including the rectal mucosa for an inch and a half or more, was a mass of necrotic tissue extending down to the sphincter muscles and the muscular coat of the rectal wall. The diseased tissue was removed by clamp and cautery as quickly as could be done and then the diseased area was thoroughly cauterized, using the actual cautery. The wounds were covered over with a dram of orthoform, which controlled the pain for forty-eight hours, and a small drain was inserted. For more than ten days no one felt sure as to what the outcome would be, but after this time slight improvement could be observed from day to day. The diarrhea was materially improved from the time of the operation and it was only a short while till little trouble was experienced from that source. After the fifth week improvement was very rapid and on the 24th day of June, 1912, he was able to return to his work. He was kept under observation for six months. Rectal irrigations of 6 ounces of argyrol, or other solutions, were continued every day and gentle dilatation of the anal muscles was practised every four or five days. To operate and fail in the postoperative treatment is inexcusable. If the original source of irritation is removed, hypertrophied and sensitive anal muscles can be reduced to their normal state by local applications of 20 per cent. cocaine solutions just preceding slow and gradually increasing dilatations every few days. This patient was so treated for six months and to the present time he reports at my office every three or four weeks. His weight has increased from one hundred and eighteen pounds, at the time of operation, to one hundred and eighty-

five pounds. It is not necessary to consume space in giving details concerning his improvement. Before the operation his blood analysis showed red corpuscles 3,200,000, hemoglobin 62 per cent.; today the red blood-cells were 4,500,000, hemoglobin 90 per cent. He has no diarrhea, eats indiscriminately, sleeps well, is free from all nervous symptoms and is in every particular a well man. This patient never could have gotten well without relieving his rectal condition; yet, I emphasize the fact that he had no rectal symptoms that would themselves suggest a rectal examination. The examination that was made which led to the suggestion of an operation was for the detection of the cause of a diarrhea that was supposed to have its location higher up in the bowel. The large, hypertrophied sphincter muscles in a thin, cadaverous man, extreme pain upon the introduction of the finger and the rough anal surface led to the belief that a great deal of the patient's general illness was due to the rectal condition.

The next case is that of a lawyer who had to leave his business more than two months ago in search of some means by which his health might be restored. When he came to see me he said he had done everything he could for eight years to improve his health, but had failed and now felt that he was "a nervous wreck."

In giving his history he said that he had from childhood been disposed to constipation. At the age of 22 he noticed a burning and aching in the rectum after the act of defecation or urination. When the pain was present in the anus he felt a similar sensation in the end of the penis. He had been told that he had hemorrhoids and for a number of years he used every kind of salve that was suggested to him. His constipation gradually grew more obstinate till it was necessary for him to take a laxative every night, since he had no natural desire for the bowels to act. In 1905 he consulted a physician in a neighboring city and was advised that he was suffering from anal fissure and contracted sphincter muscles.

After several months' treatment the fissures were healed, but the pain and tight condition of the muscles continued to annoy him greatly. The burning in the rectum and urethra and the contraction of the sphincter muscles would compel him to get out of bed at night and sit over a vessel of steaming water to get relief. For a number of years he has confined himself to a very limited diet list, and even then he has suffered a great deal from inability to digest his food. Recently his indigestion has been very annoying. During the progress of his disease he has developed a nervous condition that has annoyed him very much. When in the courtroom his impatience and irritability were beyond his control. He knew he was not like other men and,

try with as much effort as he might, he was utterly unable to control himself when his nerves were put to a test. In his case, as in all others similarly affected, there developed an emotional or hysterical disposition. When detailing the history of his case it was impossible for him to refrain from tears. When he became interested in a subject his enthusiasm was intense and it was very difficult for him to relax and engage in a new line of thought.

When the rectum was examined it was found that the anal muscles were tightly contracted and greatly hypertrophied, and excruciating pain was experienced when the finger was passed through the anal canal. No lesion was present about the anus or rectum except, as I have reported in other cases, there was a slightly granular condition of the anal structures, especially along the posterior surface. If a diagnosis could have been made only on the evidence of a lesion in this locality, a negative opinion would have been necessary. There was no suggestion of any of the pathologic conditions from which we might expect symptoms about the rectum.

An operation was advised and done the following day. The sphincter muscles were gently dilated and when the divulsions were complete no other evidence was necessary to explain the reason for the various symptoms complained of. All the structures overlying the sphincter muscles, especially on the posterior surface, were diseased. When the muscles were tightly contracted the anal surface felt comparatively smooth, but as soon as the tissues were put on a little tension the surface gave way at many points. Such divulsion would do no injury whatever to a healthy elastic tissue. The diseased area was thoroughly removed by means of the clamp and cautery. For ten days no convalescence could have been more delightful. His appetite and digestion were good, bowels natural, slept well, and he felt a relaxation that he had not experienced in fifteen years. On the tenth day the sphincter muscles were slightly dilated and he complained of an indefinite pain or weight in the left posterior rectal region. He described it as an aching similar to the pain he had suffered with for so many years. Three days later I dilated the muscles again and he had more pain than before. I could not understand why this aching should be complained of after the operation. A Bodenhamer speculum was introduced and opened enough to observe the posterior anal surface. By gently manipulating a very flexible probe I succeeded in passing it three and a half inches along the left posterolateral wall of the rectum. Knowing that a probe could not be relied upon to determine the course and extent of rectal fistula, the patient was taken into the X-ray laboratory, bismuth was introduced into the

cavity until it was filled and skiagraphs were made. (Plate XIX.) The cavity was found to occupy a space between the outer wall of the rectum and the levator ani muscle. By the use of cocaine an ample opening for drainage was made by splitting the tissues from the posterior median line toward the left with the circular muscular fibers.

The wound is dressed every day and the patient is in excellent condition. His blood analysis before the operation showed red blood-cells 3,500,000, hemoglobin 60 per cent. He has gained ten pounds since the operation and is improving rapidly in every respect.

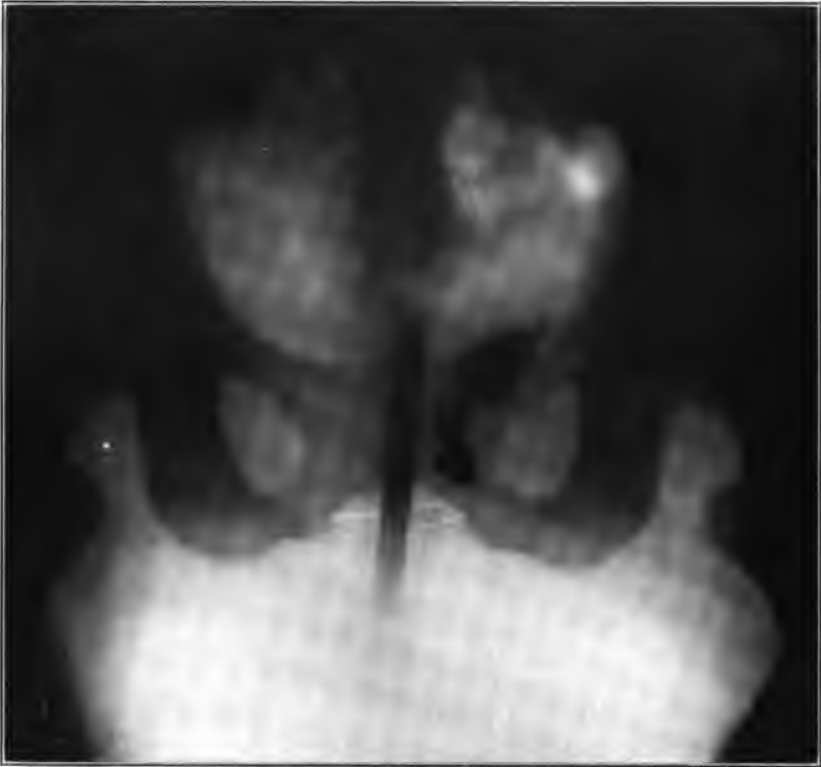
This patient throughout his illness was told by his family and physicians that he had no disease except that he was nervous and there was no reason why he should not exercise better control over himself. His brother said that he had often thought his trouble was imaginary and that he was lacking in will-power. Every nervous individual is thus accused when no definite cause can be pointed out.

Another case that fully illustrates this type of disease is recited by Mathews: "A well-known banker was treated for many things until finally a diagnosis of cancer of the rectum was agreed on. No operative interference was suggested. The patient was put upon a special diet and the unbearable pain was quieted by opium. The patient lost flesh, energy, and spirit. After many months of suffering and after being told that no cure could be afforded he was called in, administered ether, divulsed the sphincter muscle, and the cancer (?) rapidly disappeared and the patient was soon at his desk again." A simple ulceration had been mistaken for malignancy. The same author reports, during his long experience, 4 cases of supposed epilepsy relieved by operations upon the rectum.

Another rectal disease deserving mention in this connection is pruritus ani, which, properly speaking, is rather a symptom of several pathologic conditions than a distinct disease. This harassing condition is well known as a potent factor in undermining the general nutrition and exhausting the nervous system. In the most intractable form of anal pruritus I have found its cause to be an infection of the subcutaneous and submucous tissues, which can only be cured by excision of the involved integument and mucosa and cauterization of the infected area. When cured by local treatment the general health is promptly regained.

I have considered the most prominent diseases of the rectum and anus in their relation to the general systemic nutrition, and desire to reiterate the statement already made that all rectal diseases of importance exercise, in an exceptional degree, an influence upon the general health.

PLATE XIX.



Skiagraph of rectal fistula.

CHAPTER XXVIII.

Rectocolonic Alimentation.

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INDIANAPOLIS, IND.

IN many diseases, an amelioration of symptoms or a cure necessitates the placing of the upper portion of the alimentary canal at functional rest for a short or long period of time. In such cases, a variety of methods for the nourishment of the patient have been devised, the most natural and successful of which is the employment of rectocolonic alimentation. The use of nutrient enemata is a very old method, it having been recognized so long ago as the time of Celsus as an important therapeutic resource. It was not until 1872, however, when Leube¹ first advised and employed the meat-pancreas enemata, that this method of feeding was placed upon a scientific basis.

Rectocolonic alimentation is seldom, if ever, required in the treatment of anorectal diseases; and yet, its employment may be necessary in the treatment of a patient who has an anorectal disease associated with some remote pathologic lesion which makes nourishment of the body by mouth-feeding impossible. The proctologist is frequently consulted with regard to the advisability of using certain formulæ and the technique that should be followed in the administration of nutrient enemata. It seems justifiable, therefore, that, even in a work devoted exclusively to the consideration of diseases of the anus and rectum, some space should be given to a discussion of this very important subject.

INDICATIONS.

Rectocolonic alimentation may prove to be a most important agent in the therapy of nutrition, and it is indicated in the following conditions:—

1. In diseases where the most carefully selected and prepared diet cannot be tolerated.

¹ Deutsches Archiv für klinische Medicin, 1872, vol. x.

2. In diseases where it is impossible for food to either enter or leave the stomach.

3. In diseases the cure of which, or the alleviation of symptoms, demands functional rest of the upper alimentary canal for a short or long period of time. In such cases the patient is still able to swallow and willing to do so, but food given by the mouth is liable to produce injury or interfere with the cure of the disease.

4. As a pre- or post- operative treatment in surgery of the upper alimentary canal, it being deemed expedient to maintain or increase the nutrition of the patient, and at the same time to place the diseased part at rest for a few days either before or after the operation has been performed.

In general, therefore, it may be stated that when, for any reason whatever, nutrition by the mouth is impossible, or when for therapeutic reasons a short or prolonged rest of the upper alimentary canal is indicated, rectocolonic alimentation will prove to be a most valuable asset in the therapy of nutrition.

ABSORPTION.

The question of the absorptive power of the colon is one of great interest to clinicians, and the exact proportion in which the various materials in nutrient enemata are made use of as a food is a matter upon which there exists a marked difference of opinion. While it has been demonstrated that an individual can live and enjoy good health after his colon has been removed, this is no proof of the uselessness of this portion of the alimentary canal. It is by means of the absorption of water from the intestinal contents which occurs in the colon that the body is protected against the loss of fluid which would otherwise take place. There are some who attach great importance to this method of nourishing a patient, and believe that the colon is capable in a high degree of absorbing nutrient material. On the other hand, there are some who claim that the method is valueless, basing their opinions upon the belief that the absorptive power of the colon is a very low one. Great credit is due Leube, Voit, Bauer, Kussmaul, Nothnagel, Plantenga, Eichhorst, Brandenburg, Grützner, Huber, Ewald, Christomanos, Boas, and others, who have devoted much time and study to this subject. The investigations of these men have proven most valuable in the treatment of patients in whom nourishment is a matter of extreme importance and the employment of nutritive enemata is indicated. As a result of their numerous and various experiments, we may deduce the following conclusions:—

1. Water is readily absorbed, but with greater rapidity upon the addition of sodium chloride.

2. Alcohol, in the form of wine, whisky, or brandy, well diluted, is perhaps better absorbed than anything else except water. It is apt, however, to prove irritating to the mucosa if used too frequently.

3. Peptones are well absorbed, but in too concentrated solutions or in too large quantities they may prove irritating and are not well retained.

4. Milk proteids are not well absorbed. Previous peptonization is advised.

5. Eggs given alone or in pure water are not well absorbed, but if 15 to 20 grains of sodium chloride are added to each egg they are almost as well utilized as if they had been peptonized. Huber has shown that the addition of salt after peptonization increases their absorption considerably.

6. Raw beef-juice is very completely absorbed, but its prolonged use may prove irritating and produce violent diarrhea.

7. Albuminoids, such as gelatin, are not absorbed.

8. Glucose is well absorbed, but in concentrated solutions it irritates the mucosa.

9. Starch seems to be fairly well absorbed, even in the raw state, and is not at all irritating. It is readily absorbed when it has been previously acted upon by ferments.

10. Fats cannot be handled to good advantage and should be employed in as small quantities as possible. It has been demonstrated that the colon can absorb a small proportion of fats with a low melting point, provided they are emulsified.

It may, therefore, be considered as an established fact that the addition of sodium chloride facilitates absorption of nutritive enemata. It must also be concluded that peptonization of proteids increases their absorption very much. From a clinical as well as a scientific standpoint, it has been clearly demonstrated that the best ingredients for nutritive enemata are as follows:—

1. Peptonized milk to which is added sodium chloride.

2. Peptonized eggs to which is added sodium chloride.

3. Peptones and albumoses.

4. Raw beef-juice.

5. Sugars, preferably glucose or grape sugar.

6. Starch. Some believe this to be more appropriate than sugar because its saccharification occurs slowly and produces no irritating effects.

7. Alcohol, in the form of wine, whisky, or brandy.

While authors may vary in their views as to the amount of the proteids, carbohydrates, and fats which are absorbed by the rectum and colon, yet they are of one and the same opinion that, if properly proportioned and care exercised in the technique of administration, nutritive enemata are absorbed to a considerable degree.

It has long been the popular belief that they are absorbed chiefly in the large intestine, and that the ileocecal valve prevents the entrance of food from the large to the small intestine. Grützner,² however, has shown that particles of any material, dissolved or suspended in a physiologic salt solution, when introduced into the large intestine, may, under certain conditions, even reach the stomach. If a distilled water, hydrochloric acid, or potassium chloride solution was employed as the vehicle, the results were negative. He injected an emulsion of starch, in physiologic salt solution, into the rectum, and succeeded in finding starch granules in every microscopic examination he made of the stomach contents that were removed several hours later by aspiration. As a result of these experiments, he is inclined to attribute this peculiar and surprising reverse movement to the presence of sodium chloride. He bases his assumption on the fact established by Nothnagel,³ that stimulation of the serous membrane of the intestine by sodium chloride may produce antiperistaltic movements of the bowel. He is of the opinion that the whole mass injected into the rectum is moved upward into the small intestine and is there absorbed in the normal manner. Swiezynski⁴ concluded that nutrient enemata do not benefit the system because they are absorbed in the large intestine, but because they reach the higher portions of the intestine and are absorbed there. It is difficult to state how true these assumptions may be, but Voit and Bauer⁵ obtained negative results without the use of sodium chloride and positive ones with it. The author is not inclined to accept the antiperistalsis theory, but rather agrees with those who think it more probable that the surface epithelium of the intestine is chiefly concerned in causing the movement of material against the direction of normal peristalsis.

By means of the X-rays, Hemmeter⁶ observed that the upward movement of the injected particles goes on simultaneously with the downward movement of the feces. In other words, there is an upward marginal current. He considers the epithelium and muscularis mucosa

² Deutsche medizinische Wochenschrift, 1894, No. 48.

³ Beiträge zur Physiol. u. Pathol. d. Darms, 1884.

⁴ Deutsche medizinische Wochenschrift, 1895, No. 32.

⁵ Zeitschrift für Biologie, 1869, vol. v.

⁶ Archiv für Verdauungskr., vol. viii.

instrumental, and says that it is not true antiperistalsis. Cannon⁷ holds that some of the material may be forced back into the small intestine and that this may occur with a high nutrient enema. Whichever explanation we accept, the fact that material injected into the rectum may and does at times appear in the small intestine, and even in the stomach, is fully established by experiments. In radiographic work on the colon, it has been observed by the author that bismuth enemata travel rapidly upward toward the ileocecal valve, and in a small percentage of cases the radiograms have shown a bismuth shadow to be present in the lower portion of the ileum. It must, therefore, be admitted as a well-established fact that material introduced into the rectum may reach the small intestine and even the stomach. It must also be admitted that in such cases some of the material is absorbed in the small intestine. Swiezynski's conclusion that nutrient enemata do not benefit the system because they are absorbed in the large intestine, but because they reach higher portions of the intestine and are absorbed there, cannot be accepted. Until more satisfactory evidence is produced, it will be well to hold to the belief that the beneficial results secured in the employment of nutritive enemata are due almost wholly to the fact that they are absorbed in the colon. As further evidence of this fact, James P. Tuttle⁸ cites two cases in which right inguinal colotomies were done for carcinoma of the transverse and splenic colon. "The patients were nourished for considerable periods of time by the use of nutrient enemata on account of secondary and reflex involvement of the stomach. In these cases it was absolutely impossible for the alimentary substance to pass beyond the artificial anus, and consequently the nutrition obtained was beyond question due to the absorption from the colon itself." Dr. H. M. Eberhard⁹ says: "Many times have I tried to find how far the nutriment is carried by the drop method and lately have been rewarded by watching two cases that had fecal leaks at the cecum. Both these cases were not given milk or any food made with milk for five days and then nutrient feeding by the drop method was begun. At the end of thirty-six hours showed evidence of the milk and egg mixture escaping from the wound." The report of these two cases not only confirms the opinion that nutrient enemata travel upward toward the ileocecal valve, but it also tends to prove that the nutrient material is largely absorbed in the colon.

In consideration of this subject, some mention should be given to

⁷ American Journal of Physiology, vol. vi, p. 253.

⁸ Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 932.

⁹ The American Journal of Gastro-Enterology, July, 1912, p. 5.

the experiments of Diena,¹⁰ who has approached the question of the absorptive power of the colon by an entirely new route. He produced in a dog an artificial anus, and then, at some distance below this, a fistula, so that food could be introduced by means of the lower opening and withdrawn from the rectum without being contaminated by the feces. Two hours after the introduction of food he washed out the rectum. This enabled him to study the amount of liquid absorbed. Hypo-, iso-, and hyper- tonic solutions of glucose, urea, and sodium chloride were employed. He ascertained that the osmotic pressure of the liquid plays an important rôle in the absorptive power of the large intestine. If a hypotonic solution was used, the absorption was very rapid; if an isotonic solution, water is scarcely absorbed, although other substances are readily taken up. With the hypertonic solution the passage of water and solids into the intestine was very rapid, but intense irritation with the production of much mucus occurred. These experiments of Diena show that if dehydration is to be combated, a hypotonic solution should be employed; on the other hand, if nutrient materials are to be introduced, they should be given in an isotonic solution, which will render them easy of absorption and not cause any irritation.

CALORIES.

The absorption of the same enema in different patients is very different. As a result, the calories that can be introduced into the body in a day vary greatly in different individuals. It is well to bear constantly in mind the fact that the exclusive employment of nutritive enemata covers only a small part of the calorific requirement of the patient. Full nutrition is almost never attained. In order that an adult may gain strength, approximately two pints of nutritious fluid must be taken by the mouth in twenty-four hours. In rectocolonic alimentation, under the most favorable conditions, we are scarcely able to cause an absorption of more than 500 calories in the twenty-four hours. This is only about one-fourth or, at the most, one-third of the amount required by a patient who is kept warm and at absolute rest. Boyd and Robertson¹¹ concluded that from 240 to 645 calories are absorbed and state that this is about one-fourth of the amount needed to maintain nutrition. Bassler¹² believes that under favorable conditions, 1200 calories daily are about all that can be expected to be utilized. He says that in light-weight patients constantly in bed, this should be sufficient to sustain

¹⁰ Arch. d. mal. d. l'app. dig., 1911, v, p. 425.

¹¹ Scottish Medical and Surgical Journal, March, 1906.

¹² Diseases of Stomach and Upper Alimentary Tract, 1910, p. 299.

metabolism without drawing on the body tissue and fluids to a great extent. Leube¹³ has calculated the caloric values of his various nutritive enemata (formulæ of which are given in this chapter), and they are as follows:—

Peptone-milk enema	270 calories.
Egg-milk enema	360 calories.
Starch-milk enema	420 calories.
Sugar-milk enema	420 calories.
Pancreas enema	650 calories.

While the above figures are exceedingly interesting and it is well that we keep in mind the calorific value of a nutrient enema, we should not overlook the fact that its non-irritating action and the possibility of its being retained is of the greatest importance. Even when the greatest care is exercised in preparing the rectum and colon for the reception of food; even when the food has been carefully selected and prepared; even when only small quantities are used, and we are provided with all the skill that a careful and competent nurse can exercise in the work, it must be admitted that rectocolonic alimentation ranks a poor second to feeding by the mouth, and failure to secure the much desired results is not infrequent. In some patients it meets with little success, or absolute failure, from the very beginning; in others it proves to be a practical method of great value. Therefore, when indicated, owing to the different inherent power in different patients, one cannot prognosticate the value of the procedure. Much will depend upon an existing healthy condition of the rectum and colon, and we should never forget the tendency of certain foods to produce irritation. In some cases, there is so little absorption of food, or the rectum and colon become intolerant so quickly, that it is of no value whatever, and has to be discontinued. In other cases, it may be continued with gratifying results and success for a long period of time. Reports of cases in which patients have been fed by this method for as long a period as three weeks, and with but little loss of weight, have been made by Gros.¹⁴ Bassler¹⁵ met with success in one case for over nine weeks. Leube¹⁶ reports one case in which the patient was nourished for six months exclusively by the use of the meat pancreas enemata. Riegel¹⁷ states that he can in every respect corroborate the favorable results that Leube reports, and in several of his own cases he was enabled to keep his patient alive for

¹³ Deutsches Archiv für klinische Medicin, 1872, vol. x.

¹⁴ Treatment of Certain Diseases of Stomach by Absolute Rest, Paris, 1898.

¹⁵ Diseases of Stomach and Upper Alimentary Tract, 1910, p. 295.

¹⁶ Deutsches Archiv für klinische Medicin, 1872, vol. x.

¹⁷ Diseases of the Stomach, American edition, 1903, p. 210.

months. In one case of esophageal stenosis, he reports that his patient was nourished by this means exclusively for a period of ten months. The author has met with success in one case of esophageal stenosis for a period of three months. In this case, small enemata, composed of readily absorbable material, were given every four hours, without producing any irritation or intolerance on the part of the rectum or colon. Several cases have been nourished by this method exclusively for periods of one and two weeks.

TECHNIQUE.

While clinicians vary considerably in their methods of administering nutrient enemata, it is always important that the rectum and colon be prepared for their reception. This is best accomplished by giving a cleansing enema of normal salt solution (250 to 300 c.c.). Many advise that these cleansing enemata be given hot, but my personal experience corroborates the statement of Tuttle¹⁸ that if given cold they act more promptly and effectually, and seem to render the rectum and colon more tolerant, so that the nutrient enemata are better retained. In addition to evacuating the lower bowel of all foreign matter (feces, mucus, remains of previously administered nutrient enemata, etc.), and exerting a beneficial effect upon the mucosa, these saline enemata undoubtedly increase the absorptive power of both the rectum and colon. Enemata which tend in any way to irritate the mucosa should not be employed for cleansing purposes. This contraindicates the use of the soapsuds enema which is so frequently prescribed. In the average case, at least one cleansing enema should be given daily, and it is well to wait one hour before the first nutrient enema is administered. In some patients, it may be necessary to employ the cleansing enema previous to every rectal feeding. In such cases, the rectal and colonic mucosa are exceedingly irritable and intolerant, and if the cleansing enema be given several times daily, it gives the rectum and colon no opportunity to regain their quietude, and rectocolonic alimentation can be carried on for only a few days at the most.

As to the size and number of nutrient enemata which should be given daily, there is a marked difference of opinion. Some clinicians prefer the larger enemata and as few as possible, while others prefer the smaller, repeated every few hours. Those who prefer the larger enemata (8 to 12 ounces) give not more than three or four a day, while those who prefer the smaller ones (4 to 6 ounces) prescribe from four to six daily. No definite rules for guidance can be form-

¹⁸ Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 934.

ulated, as it is well known that the same enema may not act the same in different patients. Therefore, the size and number which should be given daily must depend upon experience in individual cases. Some patients will retain 6, 8 and 10 ounces, even when these amounts are administered four times daily, while others are unable to retain more than 3 or 4 ounces. In patients where as much as 8 ounces are tolerated and well retained, such an enema can be given three or four times in twenty-four hours. When only small quantities (3 to 6 ounces) can be retained, it should be given more frequently (every three or four hours).

When rectocolonic alimentation is indicated, it is the routine practice of the author to begin with one of the smaller enemata (not more than 6 ounces), and, in order to ascertain the tolerance of the rectum and colon, to prescribe not more than three during the first twenty-four hours. If they be well tolerated, an additional enema is prescribed during the next twenty-four hours. If these produce no symptoms of rectal or colonic irritation, the number is gradually increased until they are being administered every three or four hours. The formula usually employed is as follows: \mathcal{R} Dried peptones, $\frac{1}{2}$ to 1 ounce; beef-peptonoids or panopepton, 2 ounces; 15 per cent. solution of glucose, $\frac{1}{2}$ to 1 ounce; normal salt solution, sufficient to make 4 to 6 ounces.

I am rather partial to the small nutritive enemata, especially in the beginning of rectocolonic alimentation, and would recommend their use to those who are still somewhat pessimistic as to the value of this method of feeding. If, after a few days' trial, these smaller enemata have been well borne, one of the various larger enemata which have been recommended may be employed. However, not more than two, or at the most three, of these should be prescribed in the first twenty-four hours, as more food can be administered and greater tolerance secured than if we attempt to force nutrition. Any of the following formulæ are good ones, and can be recommended for rectocolonic feeding:—

Tuttle¹⁹ says that a good formula for rectal feeding is a mixture of 3 eggs, $\frac{1}{2}$ teaspoonful of salt, 6 ounces of peptonized milk, with or without a tablespoonful of beef-juice or beef-peptonoids, 1 tablespoonful of good rye whisky.

Ewald²⁰ recommends: 2 to 3 eggs are well beaten with $\frac{1}{2}$ an ounce of cold water. Then a knife-point of wheat flour is boiled with $\frac{1}{2}$ cup of 20 per cent. grape-sugar solution, and 1 glass of red wine

¹⁹ Diseases of the Anus, Rectum, and Pelvic Colon, 1902, p. 934.

²⁰ Diseases of the Stomach, American edition, 1898, p. 151.

is added after the solution has so far cooled off that the egg-albumin will not be coagulated. To it the beaten eggs are slowly added. It is very well to add $\frac{1}{2}$ ounce of peptone to this mixture.

Leube²¹ recommends: 3 eggs, 3 grams of salt, 250 c.c. of milk.

Boas's²² formula is as follows:—

Milk	250 c.c.
Yolks of eggs	2.
Salt	1 pinch.
Red wine	15 c.c.

A little starch may be added to this.

In some cases it will be necessary to omit or decrease the quantity of certain constituents which excite peristalsis, or it may be necessary to add some form of opium in order that the enemata will be retained. It is the custom of some clinicians to precede the nutrient enema by some form of opium, usually in starch paste or suppository. This is objectionable both on account of the systemic effect and the local sedation of function. In rectocolonic feeding it must be conceded that the individual case must decide what elements are most necessary. In some cases, enemata which are stimulating in character or which will tend to fill the blood-vessels are indicated, at least temporarily, more than are the nourishing enemata. In exhaustion from hemorrhage, 4, 6, or 8 ounces of a warm physiologic salt solution may be used and repeated, if necessary, every three or four hours. To this may be occasionally added 2 ounces of alcohol in the form of wine, brandy, or whisky. In cases of shock or collapse, $\frac{1}{2}$ pint of hot, black coffee to which is added 2 ounces of whisky may be administered, and repeated as is deemed necessary. Unfortunately, in some cases, even from the very beginning, the use of enemata, either nourishing or stimulating, proves a failure and has to be discontinued. It is well, however, to persevere even if the first few enemata are rejected, and endeavor to find, among the various formulæ recommended, one that will suit the particular case.

As to the technique which should be employed in the administration of nutritive enemata, much has been written that tends to make it a somewhat complicated as well as a difficult procedure. If some of the presumably good advice on the part of certain writers is followed, it is very easy to ascertain why more successful results are not secured. For example, it is advised that the rectal or colon tube be introduced high up into the bowel, the distance suggested or advised being anywhere from eight to sixteen inches. It is probably

²¹ Deutsches Archiv für klinische Medicin, 1872, vol. x.

²² Diseases of the Stomach, American edition, 1907, p. 301.

true that in a few cases (and I believe that the number is exceedingly small), the soft tube can be introduced to the distances above mentioned. However, those who continue to believe in their ability to introduce a soft rectal or colonic tube high up into the bowel in the majority of their cases, I would refer to the radiographic findings of those men who have experimented along this line, and whose radiograms demonstrate clearly the tube coiled upon itself in the ampulla of the rectum. Further, when the distal end of the colon tube is honestly believed to be high up in the bowel, the introduction of the index finger into the rectum will easily and quickly determine the truth or fallacy of this belief. In the larger proportion of cases it will be found to be coiled upon itself in the rectal pouch. These statements, of course, refer to those cases in which the tube is introduced without the employment of the sigmoidoscope.

Even though the high introduction of the tube were possible in every case in which rectocolonic alimentation is employed, we have abundant evidence that such a procedure is not indicated, and, in fact, is really contraindicated. As previously stated in this chapter, the tendency of an enema (nutritive, stimulating, cleansing, or bismuth) is to travel rapidly upward toward the ileocecal valve. This has been demonstrated by radiographers to take place, even though no position of the patient is assumed which will favor its ascent by gravity. When the nutrient enema is injected or forced quickly into the sigmoid flexure or descending colon, it is more likely to excite peristaltic action and be rejected, than if it is introduced slowly and gently into the ampulla of the rectum and permitted to find its way upward into the bowel. These enemata, in themselves, are not soothing to the mucosa; hence why should we attempt the high introduction of an additional foreign body, in the form of a rubber tube, whose only tendency will be to defeat the results for which we are striving.

The following method of administering a nutrient enema is advised: The patient is placed on the left side with the knees drawn up against the abdomen, and the hips elevated upon a hard cushion or a pillow. A No. 10 to No. 12 size catheter, or small colon tube, or No. 5 Wales bougie, well lubricated with some non-irritating material, is introduced into the rectum to the distance of about three inches, so that its end is just beyond the internal sphincter muscle. To the proximal end of the catheter, colon tube, or bougie is connected a rubber tube of suitable size and length, and connected with this tube is a funnel of from $\frac{1}{2}$ to 1 pint capacity. A glass funnel is to be preferred, as it enables one to determine readily how rapidly the enema is being introduced, and whether there is any tendency to a backward

flow and its being rejected, etc. The procedure can be easily carried out by means of the ordinary fountain syringe, a Davidson syringe, or any of the hard-rubber or glass piston syringes of sufficient capacity. It is important that the tube introduced into the rectum should be small and smooth, so as to avoid any irritation of the anal canal.

The nutritive enema, thoroughly mixed, is held in a pitcher, from which it is poured into the funnel. The funnel is then elevated so that the contents can run very slowly and with the utmost gentleness through the tube. It matters not what apparatus is employed, the rule of introducing or injecting slowly and gently into the ampulla of the rectum should be followed in every case. The solution or mixture should be given at a temperature of from 98° to 100° F., as hot or cold solutions tend to stimulate peristaltic action and should not be employed. If the above plan is followed, it will rarely be necessary to use the much-advised folded warm towel to make pressure against the anus, or to hold the buttocks together, in order to prevent the enema from being ejected. In addition, it will be possible to dispense with the use of the opiate preparations in many cases. If the use of opium is demanded, *tr. opii*, 10 to 20 drops, may occasionally be added to the enema when it is ready for administration.

After the introduction of the nutrient enema, the patient should remain quiet for from one-half to one hour, and exert as much as possible of his or her inhibitory powers to assist its retention. Successful results imply regular retention for from two to four hours, depending upon the size of the enema employed. Endeavor should be made, that they not only be bland and unirritating in character, nutritious and easily absorbed, but that they be given in as condensed a form as possible. When it is necessary that they be continued for a long period of time, it is a good plan to change their character from time to time, as it will obviate irritation of the rectum and colon. Dr. H. M. Eberhard²³ reports a case of gastric ulcer in which the patient was almost exsanguinated from severe hemorrhages, and whose condition was so extreme from exhaustion and starvation that to operate was out of the question. Ulcerated hemorrhoids which bled profusely upon the passage of the tube made the use of nutrient enemata impossible. He resorted to the method of feeding nutriment per rectum by drop doses as in proctoclysis. The patient had no difficulty in retaining 2 liters of milk and 6 raw eggs daily, and was gaining rapidly when she was able to take food by the mouth. His results in this case were so eminently satisfactory that he has continued it ever since in over 150

²³ The American Journal of Gastro-Enterology, July, 1912, p. 5.

cases. He has had patients able to retain 3 liters of milk and 8 to 10 eggs in twenty-four hours. He states that it requires about one to one and a half hours for 10 ounces of milk and 2 eggs to flow into the bowel. The writer has employed this method of introducing nutrient enemata, with varying success; and while it has proven useful in selected cases, he would not recommend its employment as a routine practice in all cases in which rectocolonic alimentation is indicated. Umber²⁴ has shown that enemata reflexly stimulate the gastric secretion. Bassler²⁵ observed on two occasions that the entire gastrointestinal canal slowly moved in peristalsis after a nutritive enema was given. In one case, these movements persisted for about one hour, when they gradually subsided. The mineral alkalies by the mouth, and atropine sulphate given hypodermatically, before each enema, will control the increase in secretion and peristalsis. In prolonged rectocolonic alimentation, attention must be given to the condition of the mouth, and it is advised that it be cleansed regularly with some mild antiseptic solution.

FORMULÆ.

The material of which nutritive enemata are composed is capable of almost unlimited variation. Nearly every writer has formulated some favorite prescription of his own, of which some are too low in caloric value and others again are too bulky to be safe for continued use in the average case. The following formulæ are selected, not only to show the marked variation as to composition, but because they have been recommended by the most eminent writers upon the subject, and may prove of value in the treatment of special cases.

The Leube meat-pancreas enema is prepared as follows: To 150 to 300 grams of scraped and finely chopped beef add 50 to 100 grams of pancreas from a cow or hog, free from fat, and finely chopped. The two substances are placed in a dish and 150 c.c. of lukewarm water are added, and the mixture stirred until it forms a thick, mushy mass. If fat is to be digested, add 25 to 50 grams of fat. No starch should be added, for sugar is produced from it so rapidly that it irritates the mucosa. This enema is an attempt to imitate natural intestinal digestion, and from its use most favorable results have been reported.

Dobell recommends the following modification of the Leube meat-pancreas enema:—

²⁴ Bassler's Diseases of the Stomach, 1910, p. 299.

²⁵ Diseases of the Stomach and Upper Alimentary Tract, 1910, p. 299.

Meat (boiled and scraped)	90.0.
Boiled arrowroot	15.0.
Emulsion of pancreas	15.0.
Pancreatic powder	1.2.
Pepsin	1.2.

This mixture is digested with warm water to the consistency of syrup and 1 dram of brandy added.

Leube's peptone and milk enema:—

Peptone	60 grams.
Milk	250 c.c.

Leube's sugar and milk enema:—

Grape sugar	60 grams.
Milk	250 c.c.

Leube's starch and milk enema:—

Starch (unboiled)	60 grams.
Milk	250 c.c.

Rosenheim uses:—

Peptone	½ to 1 ounce.
Grape sugar	15 grams.
Emulsion codliver oil	1½ ounces.
0.3 per cent. soda solution	q. s. ad 250 c.c.

Riegel:—

Milk	250 c.c.
Eggs	2 to 3.
Salt	2 to 3 pinches.
Red wine	30 c.c.

Tournier:—

Beef-tea	150 c.c.
Yolks of eggs	6.
Salt	5 grams.
Red wine	20 to 40 c.c.

The eggs should be beaten up at least five minutes so as to mix them thoroughly.

Jaccoud recommends:—

Bouillon	250 grams.
Wine	120 grams.
Yolks of eggs	2.
Dried peptone	4 to 20 grams.

Singer recommends:—

Milk	125 grams.
Wine	125 grams.
Yolks of eggs	1 to 2.
Salt	small quantity.
Peptone	1 gram.

Glaessner:—

Glucose	50 grams.
Peptone	30 grams.
Alcohol	10 grams.
Water	250 c.c.
Tr. opii	few drops.

Glaessner:—

Milk	6 ounces.
Raw eggs	1 to 2.
Powdered sugar	1 dram.
Common salt	30 grains.

"May add one tube of Fairchild's pancreatin in order to facilitate assimilation. It will then possess the triple properties of proteolytic, amylolytic, and fat-splitting action."

Bassler employs and recommends:—

Whites of eggs	2.
Peptonized milk	90 c.c.

Bassler:—

Egg	1.
Salt	1 gram.
Red wine or brandy	12 c.c.
Peptonized milk	90 c.c.

Strauss:—

Milk	8 ounces.
Yolks of eggs	2.
Common salt	1 pinch.
Claret	1½ ounces.
Flour	1 dram.
Grape sugar	1 ounce.

If badly borne reduce grape sugar to ½ ounce. If odor is suggestive of acid fermentation he adds 4 grains of salicylic acid or menthol to each enema as a preservative. In hyperacidity and hypersecretion the wine is omitted. In hospital practice he recommends, chiefly on the ground of economy, the following:—

Bouillon	8 ounces.
Alcohol	$\frac{1}{2}$ ounce.
Grape sugar	1 ounce.
Yolks of eggs	2.
Sodium chloride	$\frac{1}{2}$ dram.

Lathier employs:—

Dried peptone	3 drams.
Yolk of egg	1.
Milk	4 ounces.
Pulv. starch	75 grains.

To this may be added 5 drops of tincture of opium.

Brandenburg:—

Dried peptone	20 parts.
Grape sugar	20 parts.
Sodium chloride	1 part.
Water	200 c.c.

Mering:—

Peptone	20 parts.
Milk sugar	25 parts.
Water	200 c.c.
May add alcohol	25 parts.

Fleiner:—

Bouillon	200 grams.
White wine	50 grams.

Moritz recommends:—

Grape sugar	$\frac{1}{2}$ ounce.
Malt extract	$\frac{1}{2}$ ounce.
Milk	3 ounces.
Salt	$1\frac{1}{2}$ drams.
Claret	1 wineglassful.
Eggs	2 or 3.

Kerley recommends in a child 6 years old:—

Pancreatized skimmed milk	8 ounces.
Normal salt solution	8 ounces.
Whites of eggs	2.
Under 3 months can give	2 to 4 ounces.
3 to 6 months	4 to 6 ounces.
6 to 24 months	6 to 8 ounces.
After 24 months	8 to 16 ounces.

Klopfer's prepared nutrient enemata consist of small scales, yellowish in color. When stirred up with warm water they are ready for use. Composition: Soluble protein, 22.5 per cent.; carbohydrates (starch, maltodextrin), 73.46 per cent.; and salts of wheat flour.

Fairchild prepares a nutrient enema especially devised for colonic alimentation, and gives it the name of "enemose." It is described as a dense, sterile fluid of about 60 per cent. by weight of pure nutritive total solids. It is put up in sterile vials and is ready for injection by simply dissolving in 4 ounces of warm water. It has the composition of physiologic salt solution and is free from fat, cane-sugar and alcohol. Each vial contains about $\frac{1}{2}$ grain of salicylic acid. This together with Klopfer's prepared enema does not possess any distinct advantage over the various formulæ given above, unless it be the convenience of preparation.

Boas suggests nutrient suppositories made of crystallized egg-white, with a pinch of salt, dextrin, fat, and cocoa-butter. He gives four a day. The nourishment from these is insufficient, but they may be given a trial if enemata are not retained.

In conclusion, we should not forget that any method of treatment which may, and does, in not a few cases, prove repugnant both to patients and attendants, and is not easy of performance, is very liable to fall into disfavor unless permanent beneficial results are secured. As a result, the careful selection and preparation of the nutritive enema to be employed, and the skill with which it is administered, are factors which will determine largely the success or failure of this method of nourishing a patient. While absolutely nothing can be promised, so far as supplying the calorific requirements of a patient is concerned, the careful observations and experiments of the most noted writers upon this subject have demonstrated that in rectocolonic alimentation we possess a method of treatment which is of much value in a certain proportion of cases. In what cases it will prove of value can be determined by trial only. Its value as a therapeutic agent in certain cases can no longer be questioned, and it is astonishing that it is not more universally employed.

CHAPTER XXIX.

Developmental Malformations of the Rectum and Anus.

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OCCURRENCE.

THE only reliable source of knowledge as to the frequency of occurrence of congenital anorectal defects is a study of the statistics of the great maternity hospitals. In 78,000 cases collected abroad, Cripps found 1 defect in 4588 births.

At the Lying-In Hospital of the City of New York there have been born 81,700 babies since January 1, 1890. Of these, 17 presented malformations of the anus or rectum. At the Manhattan Maternity and Dispensary of New York City, 7239 babies were born from February 16, 1905, to September 30, 1912. Only 2 of these presented anorectal imperforation, although three others showed serious malformations of the small intestine and colon above the rectum. Approximately, then, 1 baby of each 5000 born presents an anorectal defect of development.

Although this anomaly is of comparatively rare occurrence, it is very serious and it is the duty of the accoucheur, as part of his systematic examination of the newborn, to ascertain the presence or absence of anorectal malformations, so that proper measures for their relief may be instituted at the most favorable time.

Sex.—Some series of statistics show more males than females to be the victims of anorectal malformations, while other statistics show the reverse condition. Of the 41 cases personally collected by the writer, there were 26 males and 13 females, the sex of 2 not being stated. In general these defects seem to be fairly evenly divided between the sexes, males, however, being subject to a larger proportion of the very serious forms of malformation.

EMBRYOLOGIC CLASSIFICATION.

The original classification made by Papendorf in 1781 has been followed with slight modifications by practically all of the older text-books. Ball introduced a new division on embryologic lines, which, with some changes, the writer has adopted:—

Arrest or irregular development of:

A. Postallantoic gut.

1. Imperforate rectum.
2. Imperforate rectum, with vesical outlet.
3. Imperforate rectum, with posterior urethral outlet.
4. Imperforate rectum, with uterine or vaginal outlet.
5. Imperforate rectum, with spinal outlet.
6. Urogenital outlet in rectum.

B. Proctodeum.

1. Imperforate anal canal.
2. Congenital stenosis (narrowing) of anus.
3. Occlusion of anus (complete or partial).
4. Imperforate anal canal with vulvar, perineal, scrotal, anterior urethral or suburethral outlet.

C. Postanal gut; persistent or congenital tumor.

EMBRYOLOGY.

As a result of studious research, embryology is now capable of explaining nearly all of the congenital malformations of man on the scientific basis of defects of development. Several theories have been advanced as to the causation of these disturbances of development, but none of them is adequate. They are all of purely scientific interest, for, even were the cause known, correction would be impossible.

A brief outline of the known embryologic facts is presented to elucidate the classification of the malformations here adopted.

While the neural tube is forming by the inversion of the epiblast, the splanchnopleure enfolds a portion of the yolk-sac (archenteron). This is a simple gutter at first, communicating freely with the yolk-sac by a canal, the yolk-stalk, originally broad but later reduced to a slender cord, the base of which may remain as an intestinal diverticulum (Meckel's). As development proceeds, this gutter is constricted from the yolk-sack, anteriorly and posteriorly, so that an oral and a caudal *cul-de-sac* are formed, which represent the primitive foregut and hindgut. The epiblast superficial to these blind ends invaginates and ultimately breaks through, the depression over the oral *cul-de-sac* becoming the stomodeum and that over the caudal sac the anus.

The attachment of the yolk-stalk divides the enteron into two parts: an anterior portion, the foregut; and a posterior portion, the hindgut. From the latter the rectum, colon, and a part of the ileum are derived. The primitive midgut is represented by that portion of the archenteron corresponding to the attachment of the yolk-stalk.

In very young embryos, even before the intestinal canal is formed,

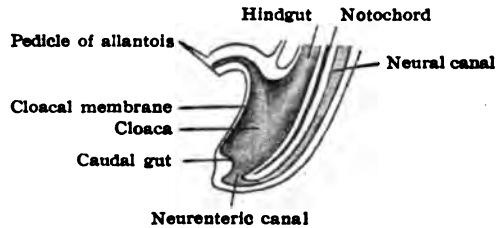


Fig. 184.—(After Stieda.)

there occurs a tubular, entodermal evagination or outgrowth from the posterior portion of the yolk-sac, called the allantois. As the hindgut grows backward the allantois is carried with it. In the third embryonal week the hindgut ends in a dilated chamber, common to it and the allantois, called the cloaca, which also receives the openings of the Wolffian ducts (Fig. 184).

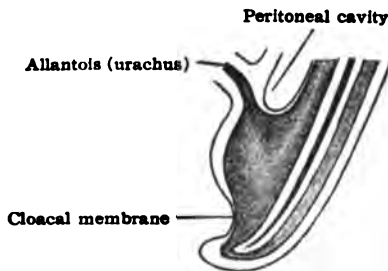


Fig. 185.—(After Stieda.)

In very early embryonal life the neural canal communicates with the intestinal canal by the neurenteric canal (Fig. 185). As the result of early embryonal closure of this canal and obliteration of the adjacent rectal *cul-de-sac* of intestine, cell rests persist, which may be responsible for the development later on of dermoid cysts and other teratoid tumors of the rectococcygeal space (Fig. 186). In the adult these remains are represented by the coccygeal gland or gland of Luschka, located just in front of the coccyx. Very exceptionally the neurenteric canal persists

as an abnormal sacral outlet of the rectum. Imperfect absorption of the postanal *cul-de-sac* may leave a congenital posterior rectocele.

Cloaca.—The cloaca is all that portion of gut caudal to the point of attachment of the allantois. This (entodermal) cloaca, or *cul-de-sac*,

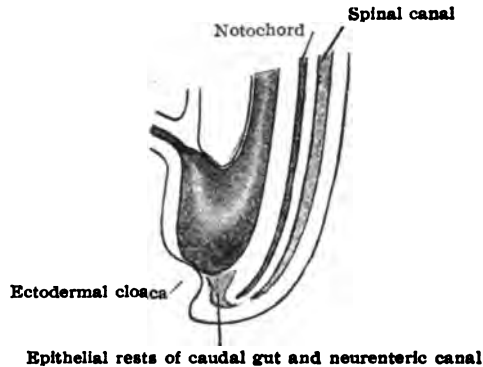


Fig. 186.—(After Stieda.)

pushes aside the mesoderm and approaches the surface of the body, finally fusing with it. This area of fusion, termed the cloacal membrane, consists, therefore, of two layers of epithelial cells, a stronger ectodermal and a weaker entodermal, and forms a septum between the cloaca and a

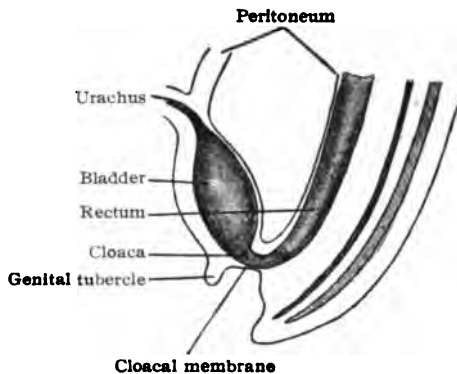


Fig. 187.—(After Stieda.)

shallow surface depression called the urogenital fossa or ectodermal cloaca (Fig. 186).

A transverse septum (urorectal) of connective tissue now divides the cloaca into a dorsal (rectal) and a ventral (allantoic or urogenital)

portion. This partition grows down between the openings of the allantois and intestine into the cloaca, parallel to its posterior wall. It is closely followed by the peritoneum, forming the *cul-de-sac* of Douglas (Fig. 187). The fusion of the connective tissue in the urorectal septum with the cloacal membrane forms the primitive perineum, and divides the membrane into two parts,—a ventral urogenital membrane, closing the urogenital sinus, and a dorsal anal membrane, closing the rectum (Fig. 188). If the urorectal membrane fails to fuse completely with the cloacal membrane, the so-called cloacal duct persists and the rectum communicates permanently with the urethra or bladder (Fig. 187), and explains these malformations. From the ventral portion of the cloaca develop

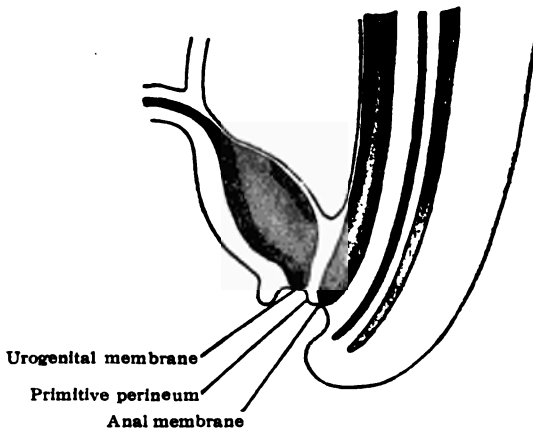


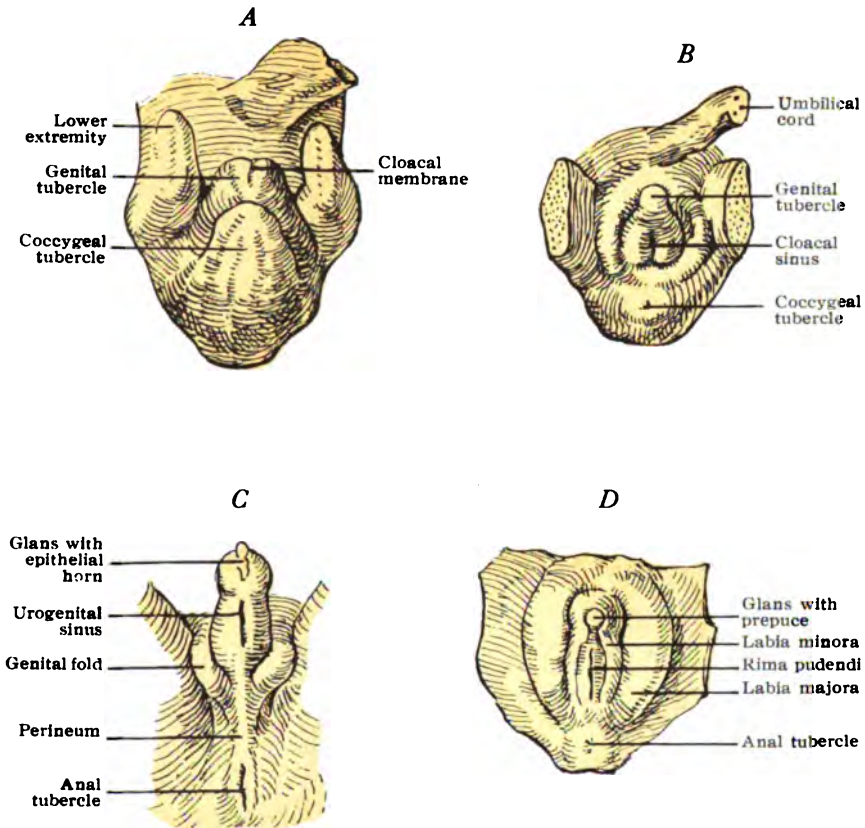
Fig. 188.—(After Stieda.)

the bladder, the prostatic and membranous portions of the urethra and the urogenital sinus, as far as the cloacal membrane, while the dorsal part of the cloaca becomes the rectum.

Before division of the cloaca, the Wolffian ducts empty into its ventral portion; after division they open into the urogenital sinus. A portion of the urogenital sinus dilates to form the bladder: its terminal portion becomes the deep urethra, while the allantois degenerates into the urachus.

The Müllerian ducts arise from the celomic epithelium quite independent of the intestinal tract. Together with the Wolffian ducts they are imbedded in a mass of tissue termed the genital cord. At about the eighth week the Müllerian ducts fuse in their lower part, the intervening septum is absorbed, and the uterovaginal canal thus formed runs down parallel to the posterior surface of the bladder and urethra as a long tube to fuse with the epithelium of the posterior wall of the uro-

PLATE XX.



Development of external genitalis.

A. Male embryo of 17 mm. vertex-coccygeal length. (After Kollmann.)

B. Male embryo of 23 mm. vertex-coccygeal length. At each side of the genital tubercle are two elongated elevations, the genital folds. (After Kollmann.)

C. Male fetus of 5 cm. vertex-coccygeal length, enlarged six times. The closure of the urogenital sinus has advanced to the anterior half of the base of the penis, but does not yet reach the free glans. The line of closure is marked by a raphé in the perineum, and is represented on the glans by an epithelial horn. (After Tourneux.)

D. Female fetus of 15 cm. vertex-coccygeal length (16 weeks), enlarged three times. The more developed labia minora cover almost the entire glans clitoridis, thus forming the prepuce clitoridis. Between the margins of the labia minora is the sinus urogenitalis, with the urethra in its fore part and the hymen in its back part. The external genital folds have now developed into the labia majora. (After Kollmann.)

genital sinus. The lower fused portions of the Müllerian ducts represent the future uterus and vagina, while their upper free portions become the Fallopian tubes. Meanwhile, the urogenital sinus has shortened, bringing the point of fusion nearer the surface, and finally, when the fused solid end of the uterovaginal canal breaks through, the orifice is superficial and the urogenital sinus becomes the vestibule of the vagina.

External Genitalia.—The cloacal membrane represents the persistent, caudal portion of the primitive streak, which, as we have seen, is located in a groove and is divided by the primitive perineum into a ventral urogenital membrane and a dorsal anal membrane (Fig. 188). By the coalescence of the margins of this groove in the region of

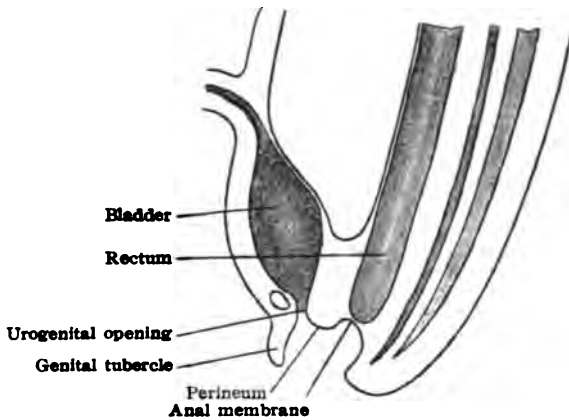


Fig. 189.—(After Stieda.)

the perineum so as to form a raphe, the permanent perineum is produced (Fig. 189). Extending forward from the perineum on both sides of the groove are two ridges known as the internal and external genital folds. These coalesce in front to enclose an epithelial eminence called the genital tubercle (Fig. 187). Until the beginning of the third month the external genitalia are undifferentiated (Fig. 187). Then, however, in the male the genital tubercle elongates to form the penis, the inner genital folds forming the urethra, and the outer genital folds the skin of the perineum, scrotum and penis. The raphe marks the line of union.

The genital tubercle in the female grows downward and remains relatively small, forming the clitoris; the inner genital folds become the nymphæ, and between them the vagina perforates. The labia majora and perineal skin are derived from the outer genital folds. (Plate XX.)

Anal Canal.—The anal opening is established during the third month, somewhat later than the completion of the urogenital opening.

Very early the epiblast grows inward, toward the rectum, forming the proctodeum. The intervening mesoblast is compressed, pushed aside, or absorbed so that finally a septum is formed, consisting only of the epithelium of the proctodeum and that of the rectum. When this is absorbed the anus and rectum become continuous. This zone of absorption marks the upper limit of the anal canal and the lower limit of the rectum as well as the point of transition from mucosa to mucocutaneous tissue and is called the pecten. At the same time the development of the external sphincter produces characteristic elevations, which further emphasize the proctodeal depression (Otis).

When studying the embryology we learned that all that portion of intestine caudal to the yolk-stalk is the hindgut, from which develop the entire rectum and colon and the terminal ileum. If the hindgut fails to develop or its development is arrested, the large bowel may be absent wholly or in part, or rudimentary, and the ileum end blindly or open at the umbilicus as the persistent yolk-stalk or diverticulum of Meckel.

In such infants other defects of development are usually associated and the victims are not amenable to surgery.

IMPERFORATE RECTUM.

This is a malformation of relatively common occurrence. In these cases the rectum may be absent or arrested in its descent at any point between the sacral promontory and a few lines above the anus. In the majority of cases arrest occurs on a level with the peritoneal reflexion, which in females is approximately 2 centimeters from the perineum and in males $2\frac{1}{2}$ to 3 centimeters. In some instances, when the rectum descends to a lower level than the apex of the invaginated proctodeum, coalescence does not occur, as the latter may be on a more anterior plane, passing up toward the prostate or vagina, as in the well-known case of Amussat, where the anal canal opened into the vagina. In such cases the rectum is usually on a more posterior plane parallel to the sacrum and coccyx. Again, the lumen of the rectum may be partly obliterated by agglutination or adhesion of its mucosa, or by thin, annular, membranous septa, or a fibrous cord may extend from the apex of the rectum to the anal *cul-de-sac* (Fig. 190).

Such a cord may likewise be found at times, extending from an imperforate rectum to the bladder or urethra and occupying the same position as would a congenital fistula between these organs. Considerable speculation has arisen as to the nature of this cord and the multiple septa. The claim that an originally patent lumen has become obliterated by prenatal inflammation is, we believe, untenable. Embryol-

ogy explains it simply and doubtless correctly. The muscular and connective-tissue layers of the colon are derived from the mesoblast, the mucosa from the hypoblast. Now, if for any reason the mucosa of the enteron fails to develop and descend equally with the derivatives of the mesoblast, the latter, instead of surrounding a lumen, form a cord composed of muscular and connective-tissue elements, but no epithelial

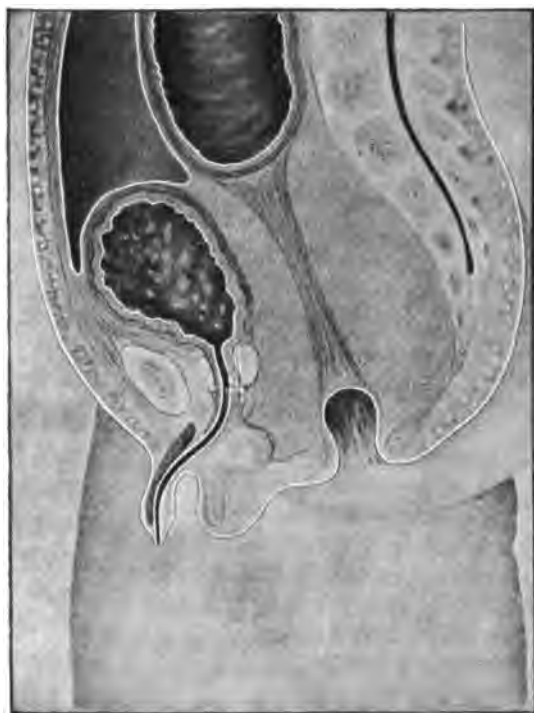


Fig. 190.—Imperforate rectum. (After Tuttle.)

cells (mucosa). Had the mucosa ever been present, the microscope would demonstrate residual epithelium.

An irregular development of the bony framework of the pelvis, frequently associated with imperforate rectum, may indicate a general disturbance of development of the hind end of the embryo. Ball notes the following: Tuber ischii too close together, coccyx absent, or the sacrum malformed.

Diagnosis.—Absence of the meconium is usually the first symptom to cause an examination. The anus may be absent or a well-formed anal canal may exist (Figs. 191 and 192). The rectum may be at a lower level in the case of the former than the latter. Diagnosis of imper-

forate rectum rests upon: absence of meconium from an anal opening; absence of anus or an anal canal which ends blindly, arresting the lubricated little finger or a probe at a depth of 1 to 1½ cm., where the fundus can be seen to be imperforate by light reflected through an ear speculum; impulse conveyed to the examining finger when the child cries, or when pressure is made over the hypogastrium (this impulse being present only when the rectum is low and in line with anal canal);

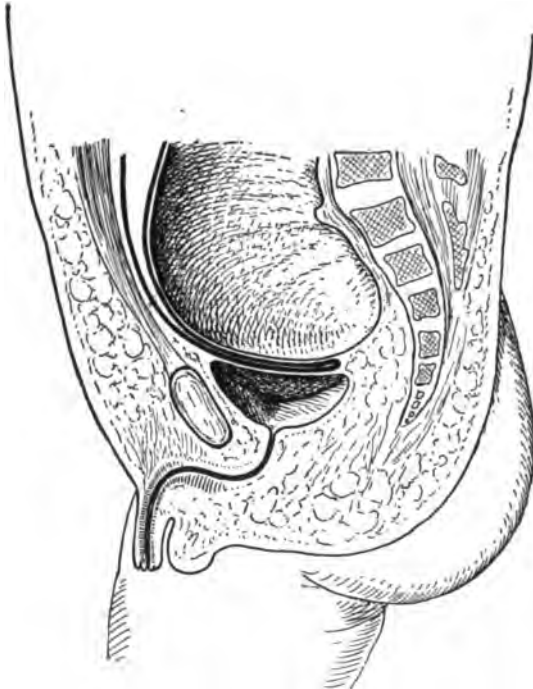


Fig. 191.—Imperforate rectum, anus absent.

and in some cases attendant malformations of the bony framework of the pelvis.

If no adventitious opening affords adequate relief, abdominal distention quickly supervenes with vomiting, refusal of nourishment by the little sufferer, marked prostration and frequently jaundice—in brief, the classic picture of intestinal obstruction.

An attempt should always be made to inject water through the anal canal if there is the least doubt of its occlusion, for congenital volvulus will give the same picture of obstruction as does imperforation, but the treatment is quite different.

In this as in all other forms of anorectal malformation, diagnosis can usually be made correctly by a careful physical examination, including observation of the urine and associated defects in other parts of the body.

IMPERFORATE RECTUM WITH VESICAL OUTLET.

This is a rare condition, especially so in females (Fig. 193). The communicating passage lined with mucosa is usually very narrow and

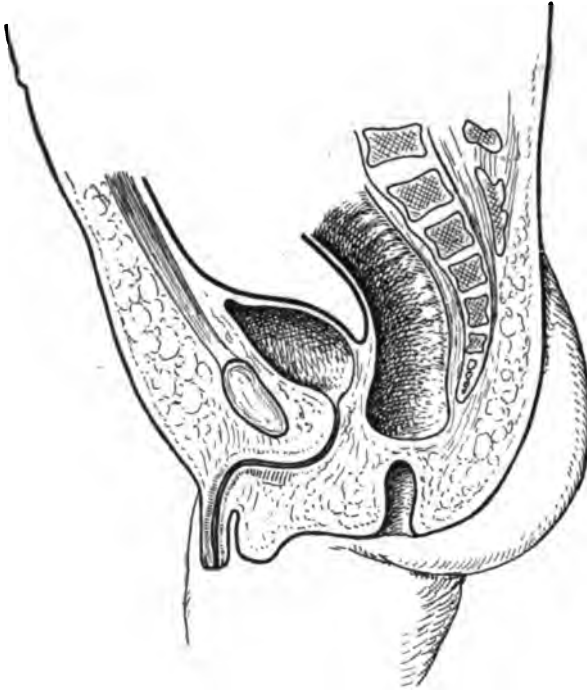


Fig. 192.—Imperforate rectum, anal canal well formed.

opens into the trigone or nearer the fundus. Consequently, symptoms of ileus soon occur, and, following the presence of feces in the bladder, cystitis and ascending pyelitis develop with fatal issue.

The diagnosis is made upon the signs detailed for simple imperforate rectum plus urine stained or heavily loaded with meconium. The quantity of meconium might indicate roughly the size of the opening. Theoretically the meconium should be passed only with the urine when the opening is in the bladder, whereas it would be constant were the communication with the urethra. It is practically impossible to determine this point in the newborn.

IMPERFORATE RECTUM WITH POSTERIOR URETHRAL OUTLET.

This is likewise much commoner in males than in females (Fig. 194). The passage lined with mucous membrane opens into the prostatic or, more often, into the membranous urethra and is usually very narrow, but may be so large as to furnish efficient drainage for the bowel. Several cases have been reported in which the victims attained maturity,



Fig. 193.—Imperforate rectum, vesical outlet.

always defecating per urethram. The diagnosis is made on the same data as when the opening is in the bladder with the theoretical difference already noted as to the constant dribbling of meconium and passage of flatus. Symptoms of cystitis are absent and, if the passage is sufficiently free, intestinal obstruction is delayed. The prognosis is correspondingly better.

As explained under embryology, both of these defects, communication of the rectum with the bladder or with the posterior urethra, are due to persistence of the cloacal duct. The urorectal membrane failed to fuse completely with the cloacal membrane.

IMPERFORATE RECTUM WITH VAGINAL OR UTERINE OUTLET.

The older writers included under this head cases of imperforation with vulvar outlet and accordingly stated that atresia ani vaginalis comprised about 30 per cent. of all cases. Embryologically the vast majority of these cases have a vulvar outlet and should be so classified. Relatively few examples are recorded of true communication of rectum and vagina above its vestibule, or with the uterus proper. Only 2 cases

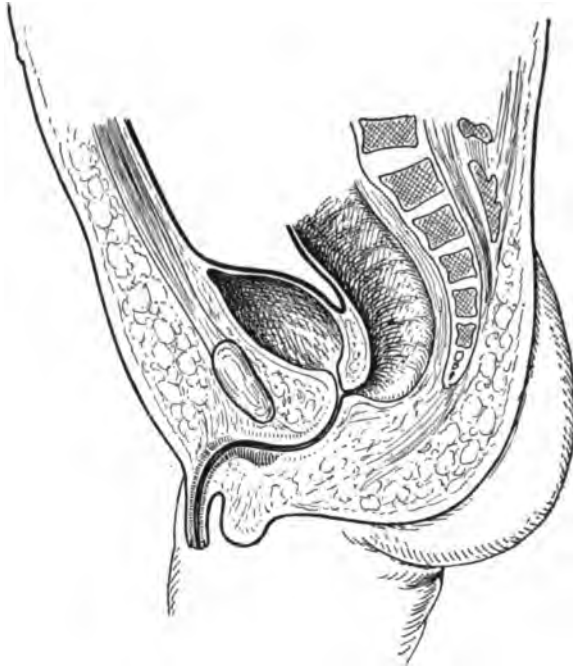


Fig. 194.—Imperforate rectum, posterior urethral outlet.

of the latter have been reported and in both the tracts were very narrow. Similarly the openings into the vagina proper are usually very small (Fig. 195). Some of the cases observed of this anomaly were accompanied by disturbances in the development of the uterovaginal tract, as uterus didelphys, or double vagina. These anomalies, as we learned in our embryological studies, are due to the failure of orderly fusion and absorption of the septum of the Müllerian ducts, and in some unknown way a communication is established with the rectum.

The symptoms and physical signs are the same as given for imperforate rectum plus the dribbling of scant quantities of meconium from an opening in the vagina above its vestibule.

IMPERFORATE RECTUM WITH SPINAL OUTLET.

This is a very unusual occurrence. Ball mentions the case of a child a few months old with imperforate rectum and spina bifida at the side of which there was a fecal opening. This anomaly is explained by persistence of the neurenteric canal, which closes normally at a very early period.

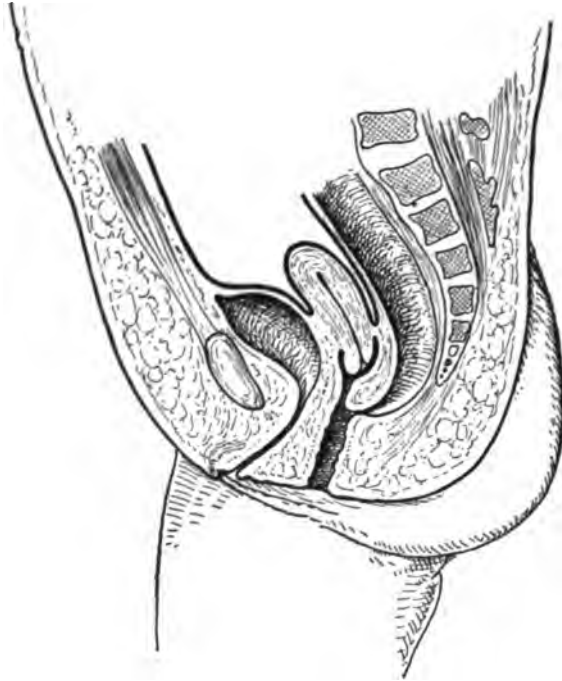


Fig. 195.—Imperforate rectum, vaginal outlet.

UROGENITAL OUTLET IN RECTUM.

Opening of the uterus, vagina or ureters into the rectum is a developmental defect the converse of the rectum having an outlet in the genito-urinary tract. Bodenhamer reports 9 cases in which the vagina opened into the rectum and 7 in which the ureters had this termination. The vaginal cases are not apt to be recognized till the menstrual flow is established, when the diagnosis is readily made by examination. In the cases observed with ureters discharging into the rectum, the ureteral openings were at the peritoneal reflection and the bladder was absent. Surgical treatment is impossible, but the rectum becomes peculiarly tolerant of the urine and renal infection may not occur for a considerable period of time.

ARREST OR IRREGULAR DEVELOPMENT OF PROCTODEUM.

As previously stated, the anal canal, as far as the pectinate line, is developed by the ingrowth of the epiblast, and its continuity with the rectum is effected by the fusion of the anal epithelium and rectal endo-
thelium into a membrane, which is finally absorbed.



Fig. 196.—Imperforate anal canal.

IMPERFORATE ANAL CANAL.

The anomalies, therefore, dependent upon arrest or irregular development of the proctodeum are (a) entire absence of anus, denoting complete failure of the proctodeum to invaginate. (b) Congenital narrowing of anus. Ingrowth of the proctodeum has occurred; the anal canal is perforate throughout, but of small caliber and inefficient. (c) Membranous occlusion, partial or complete. The anus is well formed, but ends in a *cul-de-sac*. Here the proctodeum has been disturbed or arrested in its development and the anorectal membrane has not been absorbed at all, or only partially so.

(a) In **complete absence of anus** (Fig. 196) the median raphe may extend in an unbroken line to the coccyx, or the site of the normal anal outlet may be marked by a slight depression, a discoloration surrounded by rugæ, or a corrugated cutaneous prominence. In these cases the rectum may also be imperforate, arrested high up, with or without an adventitious opening, or it may be situated just beneath the skin, indicating faulty development of the proctodeum alone. Practically the latter is of great moment, suggesting search for the rectum through the perineum before opening the abdomen. The close proximity of a distended rectum to the skin may be definitely suggested by bulging of the perineum or by an impulse felt when the child cries.

Diagnosis.—When overlooked at birth, absence of meconium, restlessness, refusal of nourishment and vomiting—symptoms of intestinal obstruction—soon demand an examination, which discloses the condition simply by inspection.

(b) A **congenitally narrow anal canal** is to be distinguished from a stricture. The former is due to faulty proctodeal development, while the latter implies a pathologic process. The canal may be narrow in a portion only or throughout its extent. So long as the feces are soft no symptoms may occur, but with age the hardened feces irritate the tissues of the inefficient canal and a condition of true stricture is super-added to the congenital narrowing.

Diagnosis.—Constipation and straining demand inspection and a digital examination. In general terms the anal canal at birth should allow the comparatively easy passage into the rectum of the examiner's little finger, which readily detects the normal elastic structures comprising its walls or the unyielding fibrous tissues, the result of inflammation.

(c) **Membranous occlusions of anus.** In a typical case of *complete occlusion* the anal canal is well formed, but the anorectal membrane persists as a very thin, elastic diaphragm of fibrous or mucocutaneous tissue at the pectinate line. As the occlusion is complete, constipation is absolute and the examining finger detects an impulse or fluctuation of the distended rectum unless the axes of the two canals do not coincide. At other times the thin membrane may be seen protruding through the anus when the child strains. If imperforate rectum is associated, the anal canal may have a funnel-like ending, prolonged above to the rectum as a fibromuscular cord the embryologic explanation of which we have stated. The length of the anal canal at birth is approximately 1.5 centimeters, and this occluding membrane has been observed at various levels below this point to 0.5 centimeter above the anal margin.

In *partial occlusion* the anorectal membrane has been absorbed in part only and is circular or crescentic in shape. The perforation is correspondingly central or lateral and of considerable size or so small as to barely admit a probe.

Another variety of partial occlusion of the anus is by a superficial band of skin crossing the anus as an unbroken median raphe, or as a transverse bridge with small openings into the anal canal on one or both sides, lined with epithelium (Fig. 197).

These represent a partial persistence of the primitive proctodeum.



Fig. 197.—Partial occlusion of the anus. (After Ball.)

IMPERFORATE ANUS WITH VULVAR, PERINEAL, SCROTAL, ANTERIOR URETHRAL, OR SUBURETHRAL OUTLET.

According to Keibel and Mall, vol. ii, p. 325, these malformations are all due to "persistence of the cloacal duct, forming a slender passage from the rectum to the raphe of the perineum, scrotum, or underside of penis, or to the prostatic urethra or bladder. In the female such a fistula may open along the perineal raphe or into the vestibule." Ball states: "In the female the genital folds coalesce to form the skin of the perineum, but remain separated as the labia majora and nymphæ of the vulva, so that if they include posteriorly a prolongation of the

rectum, the opening will be found in the vulva. In the male, if a prolongation from the termination of the rectum becomes enfolded in both genital folds, it is possible for an opening to exist in the anterior urethra communicating with the rectum." Quite naturally, then, the fistula may open at any point in the median raphe from the perineum

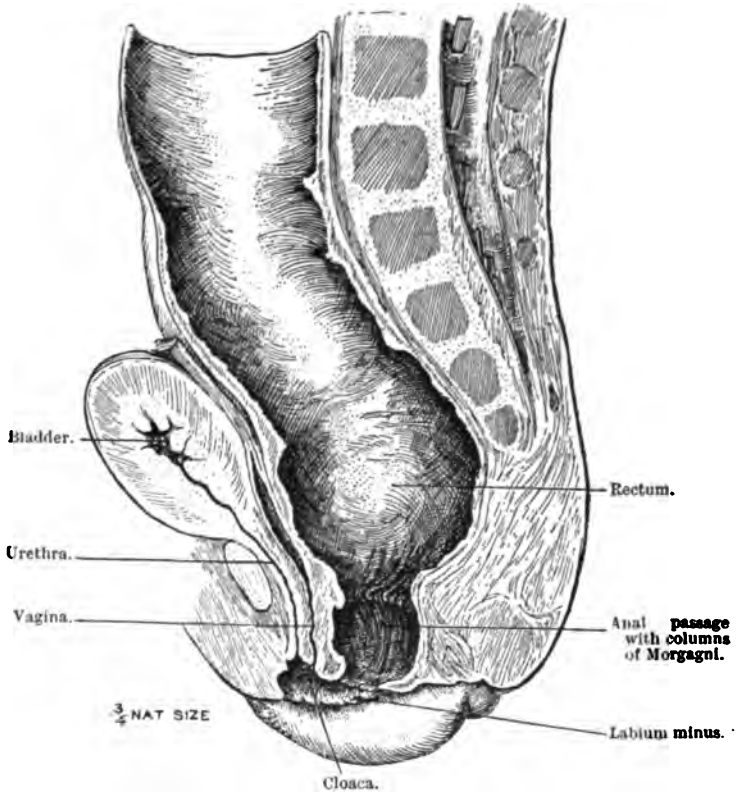


Fig. 198.—Imperforate anus, opening into a cloacal chamber. (After *Mackenzie*.)

to the prepuce. Ball considers that a persistent cloacal duct explains a communication between the rectum and the posterior urethra or the bladder, while rectal "inclusion by the genital folds" explains all the other abnormal outlets of this class. The writer concurs in the view of Keibel and Mall that any of these fistulous tracts might be formed, provided perineal tissues should encircle the cloacal duct instead of obliterating it.

Stieda claims that these adventitious passages are not faults of development, but that all are true fistulæ, *i.e.*, are the result of a

pathologic process. His view rests upon observations on a 3-day-old boy having imperforate anus with anterior urethral outlet, who died twenty-four hours after operation.

The fistula was removed intact. Sections from the anterior third showed stratified epithelium (invagination of the skin), those from the posterior part were lined with epithelium exactly like that of the rectum (prolongation of rectal mucosa), while the lumen of sections from the central portion was surrounded by connective-tissue cells

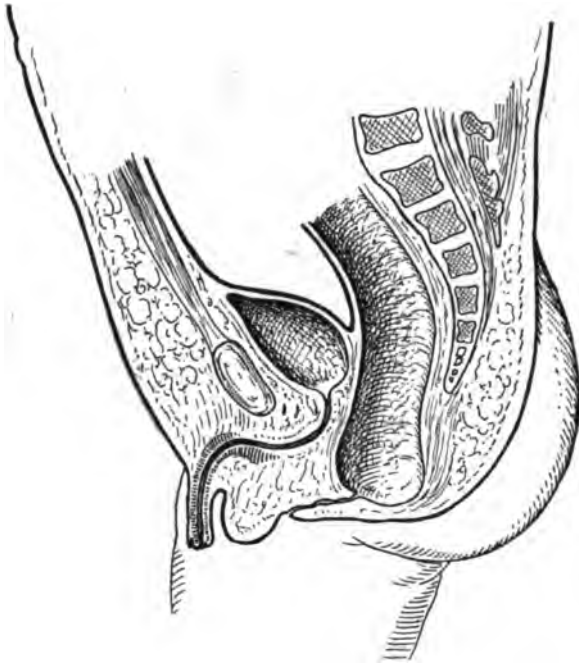


Fig. 199.—Imperforate anus, opening in perineum.

exclusively. This is an interesting observation, but not in harmony with the generally accepted teaching.

Imperforate anus with vulvar outlet is a common form of malformation. Outlet into the true vagina is very rare, most of the cases so classified opening into the vulva. The opening may be small, but is often adequate for the passage of feces and surrounded by an efficient sphincter, so that patients may go through life without knowledge of their abnormality. The lowest terminal portion of the rectum may end in the opening, but usually there is posteriorly a dilated rectal *cul-de-sac*.

Mackenzie reports an interesting case of a girl 23 months old in whom the "urethra, vagina, and anal passage still open, as in the

young embryo, into a common entodermal cloaca, but with the difference that the urinary and genital canals are entirely separate from each other" (Fig. 198). Professor Robinson comments: "That the anal orifice is not merely a proctodeal opening displaced forward (from non-development of the permanent perineum), but still opening in the external cloacal depression, is shown by its position above the bases of the labia minora."



Fig. 200.—Imperforate anus, opening in prepuce.

Imperforate anus with opening in perineum (Fig. 199), scrotum, anterior urethra, prepuce (Fig. 200), or under surface of penis, is comparatively rare and the nature of the developmental defect has been explained above. When the passage of gas and dribbling of meconium occur at the prepuce, it is important to determine whether the opening is in the posterior or the anterior urethra. In the former, imperforate rectum is present, while in the latter imperforate anus may aid in differentiating. In none of these cases is the fistulous tract adequate to drain the rectum permanently.

Prognosis.—The prognosis rests upon the nature of the malformation and the time that has elapsed since birth. When the imperforate anus or imperforate rectum has no fistulous outlet into another viscus, as the

bladder or vagina, or upon the surface through the perineum, scrotum or under surface of penis, constipation is absolute and immediate operation offers the only hope of saving the child's life.

If such a fistulous communication exists, obstructive symptoms may be deferred, but the operation should not be postponed; for it is only a question of a short time when symptoms of fecal retention will demand surgical relief. Practically the only exception to this rule is imperforate anus with vulvar outlet. Here the exit *ab initio* is often adequate or may be so made and maintained by dilatation till the tissues are more developed.

The direct causes of death in imperforation are distention of the bowel with feces and gas, with consequent intestinal paralysis; stercoremia, exhaustion from refusal of food, vomiting and absorption of toxins, and peritonitis; for although Welch found the meconium sterile at birth, it soon becomes infected. As these symptoms rapidly become cumulative, the resistance of the patient wanes with every hour's delay. In the presence of intestinal paralysis the operator may succeed in opening the bowel, but peristalsis is absent and relief is transient. Briefly, the longer the operation is postponed, the graver is the prognosis.

Marked improvement is shown in operative results by the application of modern surgical technique. Thus, in 1879, Bodenhamer reported that "of 345 patients upon whom operations had been performed 160 recovered," while in the writer's table of collected cases, nearly all of which occurred since 1897, of 34 cases operated 31 were successful in establishing fecal drainage.

Treatment.—The surgical indications in general are two: (1) To establish fecal drainage, and (2) to supply a new outlet that shall, so far as possible, imitate the natural anus in position and permanent function. From the standpoint of embryology there are many divisions of anorectal malformations; surgically, they may all be grouped in two classes: Imperforate rectum, terminating at a variable distance above the perineum, with or without an opening into another viscus; secondly, imperforate anus, with or without abnormal outlet in perineum, vulva, scrotum or under surface of penis. The anus may be absent or developed partly or completely.

IMPERFORATE RECTUM.

Unfortunately it is impossible to determine the location of the lower end of the rectum without exploration. Neither the presence nor absence of the anal canal, nor an abnormal fistulous opening, gives any reliable indication of its distance from the perineum. Indeed,

when the anus is well developed the rectum is more apt to occupy a high position than otherwise. Fortunately in the vast majority of cases, the terminus of the enteron is located at some point in the pelvis. The depth of the bony pelvis, *i.e.*, the distance from tip of coccyx to sacral promontory, is about 6 centimeters. Thus, Bodenhamer, in 465 cases collected from all sources up to 1879, found total absence of colon and rectum in but 41 instances. Cripps, in 15 personal cases, failed once only to find the bowel by perineal dissection.



Fig. 201.—Imperforate rectum. Danger of puncturing. Arrow *A* shows course taken by a trocar through the peritoneal cavity *P*. (After Cripps.)

Prior to 1835 the method of treatment was by puncture with a trocar, either directly or through a skin incision. This obsolete procedure is unsurgical and often dangerous, and, even when successful, leaves a fistulous connective-tissue passage that requires constant dilatation to prevent closure. The grave immediate danger, however, is that the peritoneal cavity may be unwittingly traversed by the trocar. Relief is temporary, although the rectum is punctured, and septic peritonitis soon develops from the extravasated meconium (Fig. 201).

Proctoplasty, *i.e.*, the formation of an anus in imitation of the natural orifice. Amussat, in 1835, proposed proctoplasty, an original procedure, which conforms to modern surgical principles and has,

with slight modifications, been practised ever since. The steps are: (a) Median perineal incision beginning just back of scrotum in males or vulvar commissure in females, and extending to coccyx. If an anal depression be present, the incision begins at its posterior margin. (b) Division of all tissues strictly in the midline down to subperitoneal fat. (c) Location and isolation of rectal *cul-de-sac*, bringing the sac to the level of the skin. (d) Incision and evacuation of the bowel contents. Finally (e) suture of the rectal mucosa to skin.

The dissection is carried back toward the hollow of the sacrum to avoid injury of the urogenital organs. Obviously when the rectum is higher, deeper dissection will be required than this simple perineal incision permits. The obstacle is the bony framework of the pelvis. In a well-developed child born at full term the distance between the ischial tuberosities is approximately from $\frac{3}{4}$ to 1 inch; from scrotum or vulvar commissure to tip of coccyx $1\frac{1}{2}$ to $1\frac{3}{4}$ inches, and from tip of coccyx to sacral promontory $2\frac{3}{8}$ inches. As contracted or malformed pelvis may also be associated with anorectal defects, the operative space may be much smaller than the normal. In order to gain more room for reaching the rectum, Amussat suggested resection of the coccyx. In 1842 he performed his first resection. The rectum was found and opened, but the child died on the fourth day from infection.

As this procedure weakens the pelvic floor, it is preferable to bisect the coccyx with scissors, as practised by Polalion in 1875 (median coccygotomy) and, if more room is needed, the median incision is prolonged to the middle of the sacrum, which is divided by scissors or bone-cutting forceps to the lower border of its third vertebra (median sacrococcygotomy of Vincent, 1887). By these procedures the supporting levators are preserved, no essential nerves are divided, and hemorrhage is slight. The osteoplastic flaps are retracted and the fascial planes and tendinous raphe between the levators are divided in the median line under sight and touch. The rectal pouch will now be discovered usually and the other pelvic organs may be recognized subperitoneally. Should the search for the rectum fail at this point, the peritoneum may be opened and the presence or absence of the enteron ascertained without further delay, a procedure conceived by Stromeier in 1844, but first practised with success by Liesrink in 1872. The real danger is not invading the peritoneal cavity, but contaminating it by opening the bowel before it is brought to the surface. The rectal ampulla is delivered through the wound, if possible; its contents evacuated, thereby elongating its canal, and sutured at the normal anal site. If the bowel is too short it

must be fixed at the lowest point it will reach without undue tension in the coccygeal or sacral regions, making sure, however, that it is dragged below the level of the levator muscles to insure their sphincteric control. Control may be further assured by Gersuny's procedure of axial rotation of the gut till the operator's finger feels sufficient stenosis and fixation by a double row of sutures. When the anus is to be made in the coccygeal or sacral regions, an elliptical piece of skin is removed from each side of the wound, as advised by Vincent, to afford a broader area of attachment of the gut, as well as to prevent infection of the deeper parts of the wound by the alvine discharges. At the same time to obviate the objection to placing the anus between two bone flaps the osseous tissue may be removed from one of the flaps.

Colostomy.—Surgical opinions are not in accord regarding the relative merits of proctoplasty and colostomy. It is idle to quote the collected statistics on the subject, for included in the perineal class are many cases of simple occlusion which require a minor operation for their correction, while many of the patients subjected to colostomy are *in extremis* from intestinal obstruction or exhausted from earlier attempts to reach the bowel through the perineum.

In 1856 Chassaignac advocated colostomy preliminary to the formation of a perineal anus at the same or a later sitting. Despite the success reported by this method, clinical experience favors limiting its application to feeble cases requiring prompt relief of obstructive symptoms.

Eliminating all cases desperate beyond any chance of relief, the results by the perineal operation are still superior to those through the abdomen. After all, in an individual case, the condition of the child will determine the nature of the operation. In the strong and vigorous, particularly if seen within twenty-four hours after birth, proctoplasty is the operation of election. Should careful search through the perineum fail to find the rectum, even after bisecting the coccyx or sacrum, or if after opening the peritoneum the bowel is located, but cannot be brought down into the wound without rupturing it, or causing undue tension, the peritoneum must be closed immediately, the perineal wound packed and colostomy performed at once (secondary colostomy).

On the other hand, primary celiotomy for exploration and immediate colostomy is the operation of choice in weak children with distention and tympany, seen some days after birth. If possible the position of the rectum must be determined with a view to the formation later of a perineal anus.

The sigmoid should always be chosen for the colostomy, if feasible, but if this is absent or cannot be recognized, the operator must utilize the most distended loop of bowel that presents.

IMPERFORATE RECTUM WITH OUTLET IN BLADDER, URETHRA, UTERUS, OR VAGINA (UROGENITAL ORGANS).

The prognosis in this group of cases is grave and general surgical principles are to be followed. The primary object is to provide drainage for the bowel; secondarily, to divide the fistulous tract and invert its ends. Proctoplasty or celiotomy as detailed above for imperforate rectum would therefore be first in order, to be followed by treatment of the fistulous tract as already indicated.

Disposition of the Anal Infundibulum.—When the anal canal is well developed an efficient sphincter ani is also present. Apart from the rather rare examples of simple occlusion of the anal canal by a thin diaphragm, the rectum in such cases is anterior or oftener posterior to the anal *cul-de-sac* or arrested at a higher plane in the pelvis. Whatever its position, the rectum should, whenever possible, be finally implanted at the normal site and the anal sphincter preserved and utilized for its control. Continuity of rectum and a developed anal canal may be effected by one of three methods: Divide the anal canal and suture the enteron into the wound, as Matas did in one case successfully (lateral proctorectorrhaphy), or remove the apex of infundibulum and unite the rectum to edge of the anal canal above the sphincter, a technically difficult procedure (circular proctorectorrhaphy), or finally "remove entirely the mucosa of the anal *cul-de-sac* down to its junction with the skin by careful dissection and substitute for it the mucous membrane of the enteron" (Matas), preserving the sphincter, of course. Experience teaches the last-named plan to be the best in practice.

UROGENITAL OUTLET IN RECTUM (ANUS AND RECTUM NORMAL).

In the 7 cases collected by Bodenhamer in which the ureters opened into the rectum, the bladder was absent. Surgery, of course, is contraindicated, but the rectum gains tolerance for the urine and some such patients have lived a considerable time without an ascending pyelitis.

In those extraordinary cases of the uterus or vagina terminating in the rectum, the outlet is large and the problem of treatment difficult. Bodenhamer reports one instance of successful operation.

IMPERFORATE ANAL CANAL (ANUS ABSENT).

The treatment would follow the principles laid down for imperforate rectum, perineal operation. The incision is so placed that its center corresponds to the site of the normal anus.

CONGENITAL STENOSIS OF ANAL CANAL.

This is usually first recognized by constipation and straining when the child is older and the stools have become formed. Gradual dilatation with the finger or bougies may be effective. If, however, the parts have been irritated by scybala and firm fibrous tissue has supplanted the normal elastic tissues, two courses are open: Posterior proctotomy, followed by systematic dilatation; or, better, remove the fibrous tissue by dissection, elevate the mucosa above, bring it down over the raw surface and suture it to the skin.

OCCCLUSION OF ANUS.

Superficial bands present no difficulties in their removal with scissors. Concentric folds causing partial occlusion of the anal canal are amenable to thorough incision followed by dilatation. In the very rare cases of complete occlusion by a thin membrane at the top of the anal canal, a crucial incision is effective, the skin tabs atrophying later. Should meconium not flow at once, however, the greatest caution is to be observed, to ascertain if the peritoneal *cul-de-sac* interposed between rectum and anus has not been accidentally opened or the bowel occluded at a higher level by septa or agglutination of its mucosa.

IMPERFORATE ANAL CANAL WITH VULVAR, PERINEAL, SCROTAL, ANTERIOR URETHRAL OR SUBURETHRAL OUTLET.

If the canal is short, opening in perineum for example, it should be dissected out with the rectal pouch, and an exit established at the site of the normal anus.

Long fistulous tracts, as those ending in the prepuce or scrotum, should be cut across after freeing and bringing down the rectum, and their divided ends inverted and sutured. The natural tendency of a small mucous canal thus isolated is to atrophy. Should its persistence cause trouble at a later date it can be dissected out. Vulvar outlet associated with imperforate anus (Fig. 198) is of great practical interest, as it comprises such a large proportion of all anorectal malformations, is so amenable to treatment and gives such favorable prognosis both

as to life and functional result. Cripps reports 14 recoveries out of 15 cases. The opening varies in size, but is usually sufficient to drain the bowel or can be made and kept so by dilatation till the parts have developed sufficiently for operation. The age at which the operation should be undertaken will naturally vary with the conditions. If the vulvar opening allows free drainage, operation may be deferred till the child is 3 to 5 years of age, when it is borne well. On the other hand, if the opening is small and, in spite of dilatation, fecal stasis occurs, operation during the early months of life involves less risk than does delay. Several methods of operation had been practised with varying success till Professor Rizzoli, in 1869, reported 4 cases



Fig. 202.—Diagram of operation for imperforate anus, vulvar outlet. *a*, lower part of the rectum, exposed by median incision, isolated and drawn toward coccyx *e*; *b*, anal opening of the rectum; *c*, remains of the membrane continuous with the hymen; *d*, divided muscles and other tissues of the perineum; *f*, two sutures passed through lower end of rectum, securing it in its new position; *g* and *h*, sutures reuniting the divided perineal tissues; *l*, a suture uniting the perineal tissues to the anterior edge of the rectum. (After Rizzoli.)

with complete success by a new method. He recognized that the relatively competent vulvar anus must be surrounded by some sphincter muscle which should be preserved and utilized. The details of his operation are: An incision surrounding vulvar opening and extending back in the median line to the site of the normal anus, isolation of lower end of rectum including vulvar outlet intact by perineal dissection, transplanting the freed bowel to the normal anal site and suturing it to the skin, closure of the perineal wound by deep sutures including the sphincters and the levators and coaptation of the margins

of the vaginal wound by superficial sutures (Figs. 202 and 203). The meritorious features of this operation are the formation of a strong perineum, a rectovaginal septum that completely and permanently separates the two organs and a competent anal outlet at the site of the normal orifice.

The writer has compiled a brief outline of 41 hitherto unreported cases of congenital anorectal defects. All of these occurred in New



Fig. 203.—The parts after operation. *a*, anal orifice of rectum in normal position; *b*, median incision united, forming raphé of new perineum; *c*, remains of tissue marked *c* in Fig. 202; *d*, the hymen somewhat depressed backward. (After Rizzoli.)

York within the period of aseptic surgery. For the privilege of reporting them, sincere thanks are extended to the members of the medical boards and other authorities of the New York Hospital, the Lying-in Hospital of New York City, the Manhattan Maternity, Bellevue Hospital, the Babies' Hospital and St. Mary's Free Hospital for Children.

IMPERFORATE RECTUM.

No.	Hospital.	Date.	Male	Female	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
1.	Bellevue, Dr. Lusk.	Aug. 8th, 1908.	X		1 Day.	One of twins.	Anus absent.	Perineal.	Cocaine.	Relief.	Sept. 16th, 1909, O. K. with dilatation.	None.
2.	Bellevue, Dr. Hartwell.	Nov. 3rd, 1910.	X		3 Days.	Vomiting, distention.	Anus absent.	Colostomy (secondary).	None.	Relief.	Not stated.	None.
3.	Bellevue, Dr. Bryant.	Dec. 31st, 1907.	X		3 Days.	Distention.	Anus absent.	Perineal.	Cocaine.	Relief.	Died, 48 hours.	Intestinal obstruction.
4.	Manhattan Maternity, No. 3638.	July 29th, 1912.			1 Day.	Poor.	Anus absent.	Colostomy (secondary).		Relief.	Died, 16 days.	Marsupium.
5.	Manhattan Maternity, No. 2253.	Sept. 25th, 1910.			2 Days.	Poor, intestinal obstruction.	Congenital stenosis, ascending colon (Autopsy).	None.			Died, 2 days old.	
6.	Lying-In, No. 777, Dr. A. B. Davis.	Dec. 5th, 1908.	X		1 Day.			Colostomy.		Died.		
7.	Lying-In, No. 7123, Dr. A. B. Davis.	Feb. 27th, 1906.		X	4 Days.	Distention, jaundice.	Anus absent.	Colostomy (secondary).	Chloroform.	Relief.	Died, 5 weeks.	Marsupium.
8.	Lying-In, No. 14639.	Jan. 27th, 1909.	X		8 Days.	Premature.	Fibrous cord from anus to ascending colon. Rectum and remainder of colon absent.	Enterostomy.	Chloroform.	Relief.	Died, few hours.	
9.	N. Y. H., No. 3976, Dr. Simonson.	Dec. 23rd, 1898.	X		2 Days.	Distention, vomiting.	None.	None.			Died.	Intestinal obstruction.
10.	Lying-In, No. 882, Dr. A. B. Davis.	Oct. 10th, 1909.	X		1 Day.	Distention, vomiting.	None.	Perineal.	Ether.	Relief.	Died, 4th day.	Postoperative hemorrhage.
11.	Lying-In, No. 1160, Dr. A. B. Davis.	Jan. 3rd, 1912.	X		1 Day.	Icterus neonatorum.	None.	Perineal.	Chloroform.	Relief.	Died, 16 days.	Intestinal obstruction.
12.	Lying-In, No. 1712.	July 21st, 1910.	X		1 Day.	Vigorous.	Anus absent.	Perineal.	Chloroform.	Relief.	Good.	

IMPERFORATE RECTUM, URETHRAL OUTLET.

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
12.	N. Y. H., No. 28167, Dr. F. Markoe.	Nov. 28th, 1904.	....	X	3 Days.	Distention, marked.	Anus absent.	Perineal. 24 hours later, colostomy.	None.	No relief.	Died, few hours.	Shock.
14.	Lying-In, No. 536, Dr. C. B. Knapp.	Feb. 23rd, 1907.	X	....	2 Days.	Dribbling urine and meconium from urethra.	Nose.	Colostomy (secondary).	.....	Relief slight.	Died, 4 days.	Peritonitis.

IMPERFORATE RECTUM, VAGINAL OUTLET.

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
15.	Lying-In, No. 747, Dr. A. B. Davis.	Oct. 5th, 1908.	....	X	1 Day.	Fair, 5 pounds.	Spina bifida. Double talipes equino. Congenital syphilis.	Perineal.	Ether.	Relief.	Died, 3 days.	Marasmus. Opening at center of posterior wall of vagina.
16.	Babies', No. 710.	Sept. 28th, 1907.	....	X	19 Days.	Fair, 7 1/2 pounds.	Anus absent.	Perineal.	.....	Relief.	Good, not traced.	Fistula in upper part of vagina not treated.

IMPERFORATE ANUS.

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anæsthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
17.	Lying-In, No. 20, Dr. Carmalt.	Aug. 13th, 1908.	X	....	2 Days.	One of twins, 5 $\frac{1}{16}$ pounds. Frail, distention.	None.	Perineal.	Chloroform.	Relief.	Good, 2 weeks later.	Not traced.
18.	Lying-In, No. 481, Dr. J. Markoe.	Nov. 1st, 1906.	X	....	1 Day.	.....	None.	Perineal.	Chloroform.	Relief.	Good.	Not traced.
19.	Lying-In, No. 164, Dr. F. Davis.	Aug. 29th, 1904.	....	X	.....	.....	None.	Colostomy.	.....	Relief.	Good.	
20.	Lying-In, No. 23, Dr. F. Markoe.	Nov. 8th, 1898.	X	....	1 Day.	8 pounds.	None.	Perineal.	.....	Relief.	Good.	43 days later, anus O. K. Gen'l condition, fair. Wt., 7 pounds.
21.	Lying-In, No. 922.	Nov. 10th, 1909.	X	....	3 Days.	.....	None.	Perineal.	.....	Relief.	Died, one month.	Intestinal stasis.
22.	St. Mary's, S. 6180, Dr. Dowd.	Nov. 29th, 1909.	X	....	3 Days.	Vomiting.	None.	Perineal.	Ether.	Relief.	Good, April, 1912.	
23.	St. Mary's, S. 2774, Dr. Dowd.	July 16th, 1906.	....	X	2 Days.	Distention.	None.	Perineal.	.....	Relief.	Good.	Not traced.
24.	Babies', No. 3387, Dr. Downes.	July 26th, 1910.	X	....	1 $\frac{1}{4}$ Days.	Distention, vomiting.	None.	Perineal.	None.	Relief.	Good.	
25.	Babies', No. 4231.	Oct., 1910.	X	....	16 Days.	Distention, vomiting.	2 thumbs, right hand.	Perineal when 24 hours old at another hospital.	.....	.....	Good.	Relieved by non-surgical treatment.
26.	Bellevue, Dr. Hotchkiss.	Mar. 14th, 1910.	X	....	2 Mos.	8 $\frac{7}{16}$ pounds, slight distention, imperforation incised by accoucheur at birth.	None.	Perineal, constriction incised.	.....	Relief.	Good, died 10 days later.	Diphtheria.

IMPERFORATE ANUS (concluded).

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
27.	Bellevue, Dr. Vosburgh.	Sept. 22nd, 1910.	X	....	9 Mos.	Distention. Imperforation indicated at birth by accoucheur.	None.	Perineal.	.....	Relief.	Good.	
28.	Lying-in, No. 22761.	Aug. 12th, 1912.	....	X	New-born.	.....	None.	Perineal.	.....	Relief.	Good.	
29.	N. Y. H., No. 2315, Dr. Bull.	Sept. 13th, 1884.	X	....	.....	.....	None.	Perineal	.....	Relief.	Good, April 3, 1886.	
30.	Lying-in, No. 15568.	Aug. 13th, 1909.	X	....	2 Days.	Distention.	None.	Perineal.	.....	Relief.	Good.	

IMPERFORATE ANUS, PERINEAL OUTLET.

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
31.	N. Y. H., No. 24823.	Jan. 25th, 1903.	....	X	3 1/4 Mos.	Good. Anus developed. Post-anal outlet.	None.	Refused.				
32.	Bellevue, Dr. J. B. Walker.	Nov. 21st, 1908.	X	....	2 Days.	Fistula 2 cm. long in perineum.	None.	Fistula opened.	.....	Relief.		

IMPERFORATE ANUS, SCROTAL OUTLET.

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
33.	Lying-In, No. 429. Dr. Lobenstein.	July 28th, 1906.	X	.....	1 Day.	Vomiting.	None.	Fistula incised on director.	.....	Relief.		
34.	Private Communication, Dr. W. C. Lusk.	Feb. 27th, 1907.	X	.....	4 Days.	.....	None.	Perineal. (Fistula not treated.)	None.	Relief.	Died, few months later.	

IMPERFORATE ANUS, VULVAR OUTLET.

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
35.	Babies', No. 822.	Nov. 11th, 1907.	.....	X	Birth.	Distention. Opening admits catheter. Discharges freely.	3 nates and 2 folds. Coccyx to right of midline.	Postponed till better developed.	.....	.....	.....	Readmitted Dec. 2nd, 1907, with marasmus. Died. Jan. 2nd, 1908.
36.	Lying-In, No. 13.	Apr. 22nd, 1897.	.....	X	16 Mos.	Vulvar opening admits 9 F. catheter.	None.	Postponed till better developed.	.....	.....	Died, July 7th, 1897.	Diarrhea.
37.	Bellevue, Dr. Bryant.	Jan. 7th, 1906.	.....	X	4 Mos.	Feces pass through vulvar opening.	None.	Postponed till better developed.	.....	.....	.....
38.	N. Y. H., No. 38655, Dr. A. B. Johnson.	Oct. 7th, 1908.	.....	X	7 Mos.	.....	.....	Perineal. (Fistula not treated.)	.....	Good.		

OCCLUSION OF ANUS (COMPLETE).

No.	Hospital.	Date.	Male.	Female.	Age at Operation.	Condition.	Other Abnormalities.	Operation.	Anesthetic.	Result		Remarks, Complications.
										Immediate.	Remote.	
39.	N. Y. H., Dr. Weir.	Dec. 12th, 1885.	X		2 Days.	Anus fully developed.		Incision.		Relief.		Discharged improved.
40.	N. Y. H., No. 33118, Dr. Bolton.	Aug. 18th, 1908.	X		2 Days.	Jaundice, distention, vomiting, anus developed.	None.	Posterior proc-totomy.	None.	Relief.		Discharged improved.
41.	Babies', No. 6316.	June 8th, 1912.		X		Premature. Anus developed.	Malformation of heart, Atresia, pylorus and duodenum.	None.				Died on day of birth. (Autopsy.)

SUMMARY.

Variety.	Cases.	Male.	Female.	Sex Not Stated.	Operated.	Successful.	Died Postoperative.	Un-operated.
Imperforate rectum	12	9	1	2	10	9	7 within 16 days.	2
Imperforate rectum, urethral outlet	2	1	1		2	1	2 within 4 days.	
Imperforate rectum, vaginal outlet	2	1	2		2	2	1 within 3 days.	
Imperforate anus	14	11	3		14	13	1 within 1 mo.	3 (2 died)
Imperforate anus, vulvar outlet	4		4		1	1		1
Imperforate anus, perineal outlet	2	1	1		1	1		
Imperforate anus, scrotal outlet	2	2			2	2		1
Occlusion of anus	3	2	1		2	2		
Totals	41	26	13	2	34	31		7

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CHAPTER XXX.

Malignant Tumors of the Rectum.

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SARCOMA AND CARCINOMA.

Classification.—Malignant growths of the rectum may be classified as of two varieties: *sarcoma*, composed of unripe connective tissue, rich in cells, and *carcinoma*, with its subdivisions, depending upon the origin of the epithelium.

Etiology.—Many theories have been advanced as to the cause of malignant tumor formation, but none has been accepted. Certain conditions seem to be predisposing, but no condition of itself is sufficient to account for the origin of a new growth (Lexer-Bevan). The theory of *fetal residue* or *embryonic rests* (advanced by Cohnheim from the suggestion of Virchow) is that germinal tissue, during the development of the embryo, has become displaced or separated from its normal connection, or has failed to undergo involution, and maintains its embryonic character. Stimulation to growth of a center of embryonic tissue may be caused by increase of nutrition, a decrease of resistance to growth, or by a physiological decrease or increase of local or general growth.¹

The embryonic theory is given marked consideration by surgeons who have written on the pathology of cancer (see Warren² and Senn³).

Local irritation⁴ has been given as a cause, such as cancer of the lip from pipe smoking, but Cohnheim explains this (as well as the prevalence of cancer at other orifices, such as the pylorus, os uteri, and rectum) by the complicated arrangement of the germinal structures, where folds of membrane occur, and germinal membranes join. Malignant tumors are

¹ Lexer-Bevan: General Surgery, 1908 ed., p. 752.

² Warren, John Collins: Surgical Pathology, 1900 ed., p. 635.

³ Senn, N.: Pathology and Surgical Treatment of Tumors, 1900 ed., pp. 60, 203, 536.

⁴ Drs. Ross and Cropper: "Researches into Induced Cell-reproduction and Cancer"; J. H. McFadden Researches, vol. iii, April, 1913.

not confined to the human race alone, but are found in many of the lower animals, such as mice, birds, fish, etc.

It is a well-known fact that malignant changes may occur at the margins of unhealed scars from burns, and carcinoma developing in chronic ulcers was pointed out long ago by Marjolin.

Heredity.—The popular belief in the inherited tendency to malignant growths has some justification when the family history of some cases is considered, but a careful study of a large series of cases merits the conclusion that the most that is transmitted is a tendency, which may be, and usually is, overcome. Malignant growths, however, seem to be markedly on the increase and apparently follow civilization and city-life. This may be due in part to more correct methods of diagnosis, both *ante* and *post mortem*.

Sex in Cancer of the Rectum.—The male sex is more prone to malignancy of the rectum than the female, in the proportion of 5 to 2.⁵ No solution has been found for this fact.

Age.—While cancer of the rectum occurs at almost every age, its maximum frequency is between the forty-fifth and fiftieth years, as shown by the following table⁶:—

	Finet's Statistics	Quénu and Hartmann	Tuttle
Under 20 .....	..	..	7
From 20 to 25	25	3	6
" 25 " 30			7
" 30 " 35	18	0	25
" 35 " 40	38	3	26
" 40 " 45	35	5	25
" 45 " 50	51	8	27
" 50 " 55	47	8	29
" 55 " 60	55	4	30
" 60 " 65	27	5	24
" 65 " 70	20		6
" 70 " 80	5		2

A decided increase of the disease among the young has been noted by several writers, and 6 cases of children between the ages of 5 and 10 years have been recorded occurring during one year in New York City.⁷ Ahlfeld has reported a case of congenital carcinoma of the distal end of an atresic rectum in a newborn infant.⁸

⁵ Allingham: Diseases of Rectum, p. 328.

⁶ Tuttle: The Anus, Rectum, and Pelvic Colon, p. 764.

⁷ Vital Statistics, N. Y. City, for 1900; Tuttle, *op. cit.*

⁸ Quoted by Senn: Pathology and Treatment of Tumors, p. 110.

Site of the Disease.—Wherever epithelial cells are found, cancer may occur. As reported by Heiman,⁹ of the 20,054 cases who died of cancer in Prussian hospitals, over 50 per cent. were located in the gastro-intestinal tract; 2910 of these were in the intestine, and 1204 of those in the rectum. Of 45,906 cases of cancer collected from German and French hospitals, 4.8 per cent. of them were cases of rectal carcinoma. If the cases of cancer of the sigmoid are added to the preceding cases, the percentage is raised to 6.2 per cent. This shows that in a large series of deaths from cancer of all parts of the body 6.2 per cent. were situated in the rectum and sigmoid.

The anal area, up as far as the internal sphincter, is the site in about 6.7 per cent. of rectal cases. The rectum for 2 inches upward from the internal sphincter shows a proportion of 26.3 per cent., while the remainder of the rectum is the site in 67 per cent.¹⁰ This indicates the relative frequency with which the rectum is involved above the peritoneal investment, and also that over two-thirds of all cases of rectal cancer cannot be extirpated without opening the peritoneal cavity.

The squamous or pavement epithelioma attacks the anal portion of the rectum; the adenocarcinoma and medullary cancer are found most frequently in the rectum proper, while the scirrhus is the type usually found in the sigmoid. These are not absolute rules, but only indicate the varieties of carcinoma most likely to be found in the different parts of the lower bowel.

An adenocarcinoma may retain its adenomatous type except for an increase of tubules lined with cylindrical epithelium. The only method of determining the beginning of malignancy in the specimen is by observing that the submucosa has been penetrated by the tubules, for the tubules and cells vary only slightly from the normal rectal tissues. Carcinoma may involve a small portion of the gut, resembling a flat disc, or a large part in longitudinal section, or may extend entirely around the rectum. The mucous membrane may be only slightly involved, and yet there may be extensive infiltration into the muscular wall, or even into adjoining structures, or there may be wide diffusion of the growth on the mucous surface, with only slight extension into the deeper parts. The process of invasion takes place through the lymphatics of the submucosa. In the early stages of the disease cancer of the rectum is confined to the rectal wall, or the wall and the neighboring lymph-nodes, but in some rare cases metastasis occurs very early, involving the lymphatic glands of the mesentery, the prevertebral or the deep iliac nodes, and even the liver and lungs. Cases are seen in which the tumor cells have penetrated the peritoneal

⁹ Tuttle: *Op. cit.*, p. 761.

¹⁰ Tuttle: *Op. cit.*

coat of the rectum and formed nodules resembling tubercles on the adjoining loops of intestine.

Epitheliomata are found in the rectum as flattened growths, without a pedicle, and may be small in extent or entirely surround the lumen. They are composed of the same kind of squamous epithelial cells as those found at the anal area, and are not primary growths, but are secondary to anal cancer. Metastasis is neither early nor distant in anal epithelioma, and when present involves the superficial inguinal glands, as the lymphatic circulation is the most direct to these glands through the perineal tracts. Epithelial pearls are often present in large numbers, mingled with strands of epithelial cells.

Histologic Varieties.—As all carcinomata consist of the association of two elements, viz., epithelial cells and connecting network or stroma, any classification must depend on the variety of cells and the amount of stroma. A division into four classes, depending on their histologic structure, would make: 1, the epithelioma; 2, the adenocarcinoma; 3, the medullary; 4, the scirrhus. The appearance, both macroscopically and microscopically, of any of these varieties may become so altered by degenerative changes or pressure that it may appear a different type from what it really is.

The *epitheliomata* are found principally at the mucocutaneous junction of the anus and begin as slight, fixed nodules, which become wart-like, are followed by ulcers with indurated bases and irregular margins. The ulcerated area tends to extend on the skin surface rather than toward the rectum. The growth is slow, and the discharge is thin and irritating.

The adenocarcinoma is the variety found most frequently in the rectum. In about 6 per cent. of cases of cancer of the rectum the anal canal is the primary source of malignancy.¹¹ "Excluding the stomach, the rectum is the most frequent seat of cancer of the gastrointestinal tract." Of 551 cases, 92 were rectal.¹² In its early stages the cancerous process begins in the crypts of Lieberkühn and produces formations which closely resemble the normal structures of the bowel, while the glands of the normal rectum may themselves undergo cancerous changes. The lateral walls of the gut are less frequently involved in this variety of cancer than the anterior or posterior wall.

The arrangement of the cancerous cells is in layers; each cell contains one or more nuclei, and, as multiplication is rapid, the rectal glands become dilated, and tubules extend into the submucous coat, and finally into the muscular wall of the rectum. An increase of connective tissue occurs around the extending tubules, and the amount of this determines the

¹¹ W. J. Mayo: St. Mary's Hospital, collected papers, 1912, p. 204.

¹² St. Mary's Hospital Reports, 1910, p. 303.

rapidity of the tumor growth and its power of invasion, or, in other words, its malignancy. If the epithelial new-cell formation is in excess, the tumor is more malignant than if the connective-tissue elements are greater in amount.

In the atypical variety of adenocarcinoma the epithelial cells lining the tubules of the glands assume changed shapes, and gradually obliterate the lumen of the tubule, while in the typical variety there is a maintenance of similarity to the normal gland structure. During the extension of the growth, by division of the epithelial elements, the tumor mass increases in all directions, or extension may occur at one part by degeneration of the normal tissues. In the early stages of adenocarcinoma the growth may be felt in the submucosa as a small, movable, hardened swelling, with a somewhat elevated center; but attachment to the muscular wall soon occurs, when it loses its mobility and becomes fixed. This stage of the disease is seldom seen, as the symptoms are not pronounced.

The encircling arrangement of the rectal lymphatics tends to cause a more rapid extension into a ring-like growth than in the direction of the long axis of the gut. This circular extension of the neoplasm may, and in the later stages does, completely surround the rectum, and the caliber becomes so much reduced with the progress of the disease as to cause partial or complete occlusion. If this ring-like formation is several inches in width, it is called tubular, in contradistinction to the annular or narrower variety.

If the tumor mass increases in bulk in all directions at the site of initial invasion, protrusion into the lumen will soon occur, and neighboring organs will become involved. Ulceration of the superficial and central part of the mass occurs early in some cases and late in others. The distinctive crater-like ulcer may be felt by the examining finger. Tissue *débris*, which is foul in odor and irritating, is cast off from the ulcerated surface. Bleeding is frequent, and blood is found in most of the fecal passages. Severe hemorrhage may occur if large vessels are involved, but in the preulcerative stage the mucosa over the tumor is congested, or may contain vegetations, which slough off or become part of the tumor itself. The deposit of blood-pigment in certain cases of adenocarcinoma does not really alter the variety. Such pigmented growths are called by some writers melanotic cancer. The medullary carcinoma, which is characterized by rapid growth and soft consistency, is the most malignant variety of cancer attacking the rectum. The connective-tissue structure is only slight, and the main body of the tumor is made up of nests of cells in various stages of degeneration. Early involvement of the lymphatics and adjacent structures is inevitable. It is a very malignant tumor, extremely difficult to eradicate.

"Soft, vascular tumors belonging to the malignant type of tumors manifest the greatest degree of malignancy. In tumors of this kind the stroma, which always acts more or less as a barrier to local and general dissemination, is always scanty and sometimes is nearly wanting. The cells remain in their embryonic state, possess ameboid movements, and are reproduced with great rapidity. The nearer the anatomical and clinical aspects of a tumor correspond with inflammation, the greater its malignancy."¹³

The scirrhus carcinoma receives its name from the hard, gristle-like feel of its substance. During the progress of growth of any of the carcinomata, if there is a preponderance of connective tissue, the cellular elements are diminished by pressure, and a soft tumor may become hard. A hard tumor may become soft by degeneration.

SARCOMA.

These may be classified, according to the microscopic appearance of their cells, into the giant, round, and spindle-cell varieties, or by the presence or absence of the blood-pigment, *melanin*, into the melanotic, and the unpigmented, or the non-melanotic.

Sarcoma consists of atypical connective-tissue cells, numerous blood-vessels, and more or less stroma. If the tumor contains cartilage cells it is called a *chondrosarcoma*; if fibrous, a *fibrosarcoma*, etc. The lymphosarcoma is generally found in the small intestine. Sarcomatous growths of the rectum are generally of the small, round-celled variety, and are of rapid growth and very malignant. As a rule, they are firm to the touch early in their growth and usually single.

The *melanotic* or pigmented sarcoma is very rare, and gets its name from the color, due to a deposit of blood-pigment in the cells. General dissemination in this form of sarcoma occurs very early. The writer has seen only one case,—in a patient of 62 years,—and the nature of the growth was entirely unsuspected before operation.

As the sarcoma is a connective-tissue tumor, it is found beneath the mucous membrane as a rounded or oval mass, not as hard as a scirrhus cancer, nor as soft as an adenoma. It is usually single, but may be multiple, and varies in size from that of an olive to that of an orange. Its growth is much more rapid than cancer, and it produces metastasis through the blood-current. The cells composing the tumor may be seen in direct contact with the walls of the numerous blood-vessels. Rectal sarcomata may be primary with secondary deposits elsewhere, or the tumor in the rectum may be secondary to a primary growth in another organ.

¹³ Senn: Pathology and Treatment of Tumors, p. 110.

A guarded prognosis should always be made as regards operative removal. In a case of the writer's, in which the preoperative diagnosis was hemorrhoids with fissure, at the time of operation a rounded mass was felt at the left posterior anal commissure, just beneath the mucous membrane. There were no signs of inflammation, and, as the patient was under an anesthetic, no symptoms of pain could be elicited. An incision was made into the tumor, and inspection of the cut surface showed a pigmented sarcomatous mass.

This was removed in its entirety, and microscopic examination showed it to be a round-celled sarcoma with irregular deposits of pigment. The patient's physician was informed of the serious nature of the growth, with a request to keep the writer advised as to the progress of the case.

About six months later, information came that an exploratory operation had been done for gastric distress, and it was found that the stomach and liver contained many sarcomata, which, of course, were irremovable. Death occurred in less than a year.

In the later stages of the growth the mass protrudes through the mucous membrane, and may finally become pedunculated, or may remain with a broad base. The pigmented sarcomata have been mistaken for gangrenous hemorrhoids. Loss of appetite and indigestion are usually found in association with these growths, although pain depends on nerve involvement and, therefore, varies with the location.

Thorough removal is the only hope of cure. The use of Coley's fluid, composed of the mixed toxins of the streptococci of erysipelas with the toxins of *Bacillus prodigiosus*, has given cures, especially in the spindle-celled variety. *Endotheliomata*, springing from the endothelium of the blood-vessels in hemorrhoids, have been described by Schlesinger; but so few of these cases have been reported that thorough knowledge of their characteristics is unknown.

The cells forming all sarcomata spring from connective tissue, and are named in accordance with the shape of the cells. The most common forms are the giant-celled, the spindle-celled, and the round-celled.

CARCINOMA.

Symptoms.—"The earliest symptom of malignant, as of many other, diseases of the rectum is the consciousness of the patient that he possesses such a portion of the body."¹⁴ Shortly afterward, there is a sensation of weight or fullness in the lower bowel or pelvis, according to the location of the growth. There is uneasiness at stool, with a desire for frequent evacuation, and a sensation of unsatisfactory emptying, as if a small amount of

¹⁴ Cripps: Diseases of Rectum, 1914 ed., p. 333.

fecal matter remained. Diarrhea alternating with constipation next occurs, as the growth encroaches on the bowel. The liquid parts of the feces pass out, while the solids are held by the growth, until injections or cathartics have dislodged them. The so-called ribbon-like stools are seen only when the growth is low down, for in the higher locations the feces collect below the growth and then may pass as well-formed stools. Pain is *not* an early symptom of malignant rectal disease; in fact, it may be a late one, as pain occurs only when nerves are involved, and this may not develop until late in the disease. Many cases, so far advanced as to be inoperable, have been seen by the writer in which pain has not been present at all.

Pain, especially in the left leg, as pointed out by Hilton, may be present, due to pressure on the sciatic nerve, while pain in the heel has been noted as symptomatic of a rectal neoplasm. In epithelioma the pain occurs earlier, on account of the skin involvement and the greater nerve distribution in the cutaneous structures.

In the preulcerative stage of the growth mucus may appear with the stools, and after ulceration blood and mucopus are seen. As contraction of the lumen of the bowel retains the discharges, fermentation follows, and a characteristic foul odor is noticed, which is almost pathognomonic of malignancy.

The amount of blood varies with different cases, but is present, either as visible or as occult blood, in all cases after the ulcerative stage. A symptom not noted by many writers is relaxation of the sphincters, with an increase in pigmentation of the perianal skin.

After the disease is well established, emaciation, with anxious expression and a peculiar sallowness of skin, may occur early, but this is not a dependable symptom, as cases so far advanced as to be hopeless, from a curative point of view, may be seen with fresh, rosy cheeks and a state of good nutrition. If cachexia is noted, however, with rectal symptoms, then it becomes an important diagnostic point. Digestive disturbances, swelling of the legs, enlarged and nodular liver, are among the later symptoms, preceding exhaustion, or acute intestinal obstruction, or peritonitis, depending on the nature and location of the growth.

The average duration of life in unoperated cases from the onset of discoverable symptoms is about two years, although in the young it may be very brief, lasting in one case reported by Cripps¹⁵ only eight months from the onset of symptoms to the date of death. In inoperable cases where a colostomy is done to relieve obstruction, life may be much prolonged, and the writer has a case in which during two years there has been but slight

¹⁵ Cripps: *Op. cit.*, p. 335.

increase in the growth. This particular case was so far advanced that nodules could be seen projecting into the bladder mucosa when a cystoscopic examination was made to determine the degree of vesical involvement. Such prolongation of life, however, is not the rule, and, while a colostomy may be necessary to relieve obstruction, in inoperable cases the duration of life is seldom more than from six to eighteen months.

The symptoms of sarcoma are very similar to those of cancer, except that in the beginning the sarcomatous growths are felt as oblong masses beneath the mucosa; they grow rapidly and become soft in the later stages.

Diagnosis.—It is most important that the diagnosis of rectal malignancy be made at the earliest possible moment, in order to give the patient the best chance of life. "I do not recall ever having seen a case of cancer of the rectum which had not been regarded by some physician as piles, and in most cases locally treated by him, usually without any adequate local examination. . . . Practically every rectal cancer is a malignant ulcer by the time it is recognized, ulceration being favored by warmth and moisture."¹⁶

The bowel should be empty, or as nearly so as possible, and a warm salt-solution enema will accomplish this. The Sims position (patient lying on the side with the knees drawn up) is used first. With the index finger covered with a thin rubber cot, well lubricated, the lower four or five inches of the rectum may be felt, especially if the patient is told to bear down. If no growth, ulceration, or symptom of disease is discovered, the next step is to have the patient assume the knee-shoulder position, the object being to get as acute an angle between the body and thighs as the figure of the patient will allow. A proctoscope (Fig. 38) is then introduced, and the obturator is withdrawn when the end has passed the internal sphincter. Owing to the entrance of air, ballooning occurs, and the rectum may be examined up to the level of the promontory of the sacrum. If ulceration or nodules are seen, the writer has the patient assume the stooping posture, and instructs him to bear down at the same time. By this means the upper rectum will be brought down to the examining finger. Next to confirmation by the microscope, the sense of touch gives the most reliable information.

If the symptoms are suggestive, and these measures fail to locate the growth, the next step is the use of the sigmoidoscope. This should be used with great care, on account of the danger of puncturing the bowel and carrying the instrument into the peritoneal cavity. The knee-shoulder position is assumed, and the electric-lighted end should show the lumen of the bowel before the instrument is inserted. It is a well-known fact that

¹⁶ Roswell Park: *Modern Surgery*, 1907 ed., pp. 886, 887.

thinning of the bowel may occur below the growth, thus offering only slight resistance to the instrument from penetrating the abdominal cavity. The utmost distance that a sigmoidoscopic examination can extend is to the junction of the sigmoid with the descending colon. If the bowel is free up to this point, then a negative diagnosis as far as this part may be given. In the writer's experience it has not been found necessary or advantageous that an anesthetic should be given.

The commonest point of occurrence for rectal malignancy is from two to four inches from the anus, and the size of the diseased area is in almost direct proportion to the duration of the growth. If the case is in the early or preulcerative stage a thickening below the mucous membrane may be felt, but the submucous coat will be found adherent to it. The mucous membrane will feel somewhat irregular, and slightly project into the bowel. This early stage is rarely seen by the surgeon, and usually it is not until ulceration has occurred that the patient comes for examination. If the case is of the laminar form, an ulcer with hard, elevated, irregular margins will be felt. The sides of the ulcer will slope rather than overhang, and the extreme edges will be rounded, instead of sharp, as in the tuberculous ulcer. Beyond the margins of the cancer, rounded elevations showing as adenomatous extensions will appear. If the case is of the annular or ring-like variety, a stenosis will be found either partly or entirely around the gut; the lumen in most cases becomes quite narrow early in the disease, but in others it will continue for some time to freely admit the finger. If the growth is within reach of the finger it is important to examine its mobility or fixation. The posterior location is the more favorable, as less important structures are involved.

The examining finger will usually be found on withdrawal to be covered with blood, and a peculiarly offensive odor will be noted. If the disease is of the medullary variety, soft, fungating masses may be felt filling the canal. Care must be taken to see that the examining finger is not in a *cul-de-sac*, caused by the growth invaginating the bowel, as the growth may appear centrally surrounded by a zone of healthy gut. The removal of a piece of the growth of proper size for microscopic examination is attended with some danger, especially if the area of distribution of the hemorrhoidal artery is invaded. The removal of small parts by a crushing instrument so alters the structure as to make the microscopic diagnosis of uncertain value. If the growth is extensive enough to act as an obstruction, it will be necessary to either excise it or else perform colostomy, and the only likelihood of performing the serious operation of excision unnecessarily would be in case of a gumma.

The examining finger should be most delicately introduced, but never be forced or even gently pushed into the stricture, as it is very easy to

tear an opening into the abdominal cavity. A bougie should never be used, as it gives no information of value, and may do great and even fatal harm. Any instrument passed into the bowel should have its pathway well illuminated, so that no harm shall be done.

The contractile ring of the annular cancer is due to infiltration of the growth at its point of origin into the muscular wall of the rectum, and, as the fibrous trabeculæ are circular, a constriction follows, as the growth becomes more firmly attached.

Differential Diagnosis.—Rectal malignancy may be confused (1) with new benign growths within the rectum, such as multiple polypi. The duration of the growths is the diagnostic point of importance. The polypi may be present for years, while cancer is of comparatively rapid growth. The bloody discharge is of different character, being clear and bright red in polypi, while in cancer it is mixed with fecal discharge and dark in color. The isolation of the growths in polypi, without induration, will show their character. Polypi may undergo malignant change, so that if induration of the base does exist the diagnosis is changed.

Cancer may be confused (2) with villous tumors within the rectum. No mistake is likely in either the laminar or annular form of cancer, but only with the fungating variety. Villous tumors may exist for years, while the fungating cancer is of very rapid growth. The discharge differs materially. Clear mucus, with blood occasionally, from the villous tumor, while the cancer discharge is foul and mixed with dark blood and mucopus. The examining finger would find the villous tumor soft and velvety on the surface and in mass, while the fungating cancer is easily torn and, although soft at the surface, is hard at the base. The villous tumor is not fixed to the muscular coat of the rectum, while the cancer is always more or less firmly attached, and is, therefore, less movable.

Of growths outside the rectum, cancer may resemble (1) growths involving the uterus, prostate, or bladder. Much narrowing of the rectum may occur from the pressure of growths outside its walls. The absence of discharge from the bowel, which would be sure to occur from a cancer of advanced growth, would indicate an extrarectal growth, and examination of the structures most likely to be affected would suffice to clear up the diagnosis.

Examination of the peritoneal sac at the rectovesical fold by rectal touch should be done. "Carcinoma of any viscus in the peritoneal cavity may permit detachment of carcinoma cells, which gravitate into the *cul-de-sac* and graft upon the adjacent sigmoid, giving rise to characteristic nodules, which indicate the nature of the primary and possibly unlocated disease."¹⁷

¹⁷ W. J. Mayo: St. Mary's Hospital Reports, 1905-09, p. 240.

In acute inflammatory conditions an extrarectal abscess might be mistaken for a cancer, (2) especially abscess of the superior pelvirectal space. The absence of discharge and the soft, warm, velvety feel of the latter would establish the nature of the trouble. If the abscess has opened spontaneously into the bowel, the discharge of pus or the absence of induration of the edges would make the diagnosis. In fibrous stricture the duration of time and the difference in the nature of the discharge would indicate the true nature of the disease, as well as the difference in the lower margin, which would show the ring of advancing malignancy in cancer, while the margin of a fibrous stricture is less hard and is not nodular.

The possibility of a misplaced uterus being mistaken for cancer of the rectum should not be forgotten. An ovarian fibroma pressing on the rectum has caused obstruction of the gut, and cases have occurred in which a stercolith which had become pocketed behind one of the rectal valves was mistaken for cancer.

MALIGNANT RECTAL GROWTHS.

Treatment.—The only cure for rectal malignancy consists in the entire removal of the growth and the associated lymphatics at the earliest possible moment. The possibilities of the curative effects of the X-rays and radium rays are being thoroughly studied, and while this is being written a wave of excitement is dashing over the world concerning the use of radium. At present, however, we will confine ourselves to the facts rather than the theories of the treatment. If the growth is found to be firmly fixed to the surrounding structures or organs, or if the condition of the patient is such that we know he could not survive an extensive operation, or if general metastasis has occurred, most surgeons, among whom is the writer, decline to perform a radical operation. In doubtful cases the writer agrees with Tuttle, who thought that as there was only one chance for life, and that one through a radical operation, the person or his family should have the option of deciding if the patient should take the chance of operation.

There is much difference of opinion on this subject, Continental writers being more radical than the English. Hartmann¹⁸ in his conclusions in his article on the "Direct Operative Treatment for Cancer of the Rectum," states that: "In the future I will reject the operation in patients over 60, the obese, and those with diseased kidneys." W. J. Mayo¹⁹

¹⁸ Henri Hartmann, Prof. Surg. Facult. Méd. Paris, in *Journal de chirurgie*, tome xi, No. 6, Dec., 1913, p. 701.

¹⁹ W. J. Mayo: *St. Mary's Hosp.*, collected papers 1905-09, 1911, p. 247.

remarks on the great mortality of the abdominoperineal operation in fleshy males.

The choice is a difficult one from any point of view. If the decision is made not to attempt a radical operation, a consideration of what may be done in *palliation* is in order. Improvement of the general health by diet, tonics, air, and pleasant surroundings is important, and it is a question if it is not better to keep the facts from the patient, on account of the great tendency to despondency. The family will usually decide this point.

The prevention by enemata of obstruction, or fecal impaction, is often attempted, but injections are productive of discomfort and often positive pain, due to increased peristalsis. If the disease has progressed so far as to produce chronic obstruction, then colostomy had better be done at once, as this procedure will in any such case soon be imperatively required. It is better to anticipate the inevitable by a few months. The comfort from colostomy is positive, and the operation is usually followed by general improvement in nutrition, and the rapidity of the growth in some cases is markedly lessened, while in all cases more or less benefit follows from the lessening of fecal irritation over the ulcerated growth.

Cleansing of the gut near the growth is important. This prevents absorption of toxins, and is accomplished easily, by allowing a warm, mild, germicidal, and deodorizing solution to flow from the colostomy opening through the gut. A 2 per cent. solution of creolin is satisfactory. If a colostomy has not been done, this solution should be given as an enema, and allowed to flow through the stenotic area, and not introduced through a tube or bougie. The patient's buttocks are elevated, and the solution will flow through by gravity, unless there is complete obstruction.

Pain should be controlled by opium or its derivatives, and a pill containing opium and cannabis indica is often satisfactory. It is progressively increased in strength by amounts sufficient to keep the case comfortable. The administration of opiates should be delayed, of course, until pain is severe, as when they are ordered the physician is advisedly making the patient an habitual user of the drug.

The use of vaccines or sera is of little or no value except in sarcoma, when Coley's fluid, composed of the mixed toxins of the *Streptococcus erysipelatosus* with those of the *Bacillus prodigiosus*, perhaps may be of service. The application of strong caustics is usually inadvisable on account of pain, but if the growth protrudes, or is easily accessible, the redundancy may be reduced by the Paquelin cautery, although Senn was opposed to this, as he says: "The partial removal of a malignant tumor, with extensive regional dissemination, is often followed by aggravation of the local conditions and hastens the fatal termination."²⁰

²⁰ N. Senn: Pathology and Surgical Treatment of Tumors, 1900 ed., p. 103.

*Anatomy of the Lowest Part of the Sigmoid and the First Part of the Rectum.*²¹—"Treves in 1885, and Jonnesco in 1889, called attention to the inaccuracy of the anatomical descriptions of the lowest sigmoid and the first part of the rectum, showing that the so-called 'first part of the rectum' should be considered the terminal part of the sigmoid down to the ending of the mesenteric attachment at about the third sacral vertebra. Here the rectum begins, and extends to the anal canal, which lies below the levator ani muscle. Embryologically the true rectum has its origin from the highly differentiated lower part of the hindgut, called the *cloaca*, which forms the bladder and rectum. This primitive association is of importance in the study of malignant disease. Symington's careful studies show the anal canal to be 1 to 1¼ inches long, completely invested with muscle, and originating in the proctodeum, and for this reason, in cancer of this location, the inguinal glands, as well as the perirectal, are liable to become involved. British anatomists divide the sigmoid into two portions: First, iliac, 5 to 6 inches in length, extending from the descending colon to the brim of the true pelvis, and having, if any, a very limited mesentery. Second, pelvic portion, averaging 16 to 18 inches in length, with a long mesentery, and loops across the median line. Cunningham states that in 92 per cent. of subjects the pelvic sigmoid lies in the true pelvis *post mortem*."

*Blood-supply of the First Part of the Rectum.*²²—"The terminal part of the sigmoid, 'first portion,' is supplied by the superior rectal artery, which communicates freely with the middle hemorrhoidal arteries. The lymph drainage follows the superior rectal vessels, which are the direct continuation of the inferior mesenteric, and *to secure the highest lymph-node, at the origin of the inferior mesenteric, it may be necessary to ligate this vessel, and remove the devitalized colon, possibly almost to the splenic flexure.*" (Italics are writer's.)

Operative Treatment.—Every case of malignant disease of the rectum presents a problem to the surgeon. The first requirement is the location and extent of the growth, and if it is attached to surrounding organs or structures. Next if there is involvement of the inguinal lymphatics; but the fact of metastasis cannot be known definitely without opening the abdomen, so that there is always an element of uncertainty until this fact is decided, which will determine the kind of operation to be done. "In establishing the feasibility of removing malignant disease of the large intestine, the examination of the liver for embolic carcinoma should not be forgotten. In our experience, *hepatic secondaries have been a larger cause of contraindication to radical operation, in mechanically removable*

²¹ W. J. Mayo: St. Mary's Hosp., collected papers 1905-09, 1911, p. 235.

²² W. J. Mayo: *Op. cit.*, p. 240.

tumors, than inoperable glandular metastases."²³ (Italics are writer's.) Next the state of health of the patient, and—as this is seldom of the best in rectal cancer, and often of the worst—it alone is of great importance.

If the growth is at the anal margin, a thorough removal of the neoplasm is all that is indicated. The method of Harrison Cripps has produced good results in the hands of many surgeons. If the growth is within

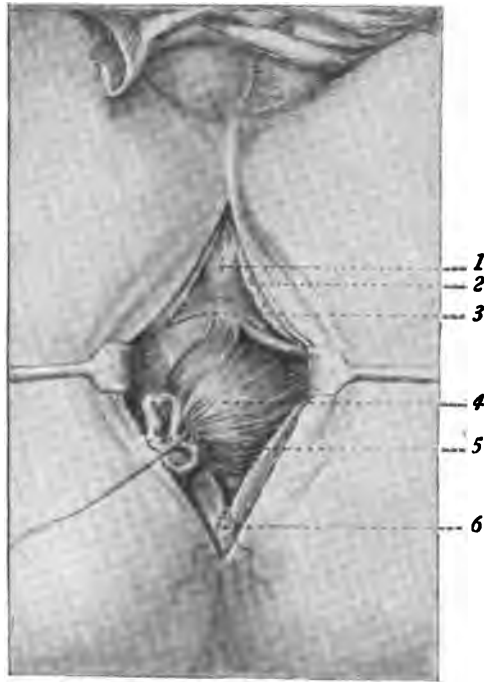


Fig. 204.—Perineal route. 1, bulbous urethra; 2, perineal body; 3, transverse perinei muscles; 4, rectum; 5, external sphincter; 6, coccyx. Quénu method. (After Tuttle.)

the rectum it may be excised by several routes: *rectal*; *vaginal*; *perineal*; *sacral*; *abdominal*, or combinations of these.

In the very early stage of the disease, and if the tumor is very low down, some surgeons practise a resection of the mucosa through the dilated sphincter similar to a Whitehead operation for hemorrhoids. If the mucosa is attached to the muscular wall of the gut, this will show that infiltration has begun, and a more thorough removal, as admitted by all, is necessary. There should be over a half-inch of healthy mucosa left above

²³ W. J. Mayo: *Op. cit.*, p. 240.

the growth, as this is the minimum of safety. It is in only a limited number of cases that a circular resection of the mucous membrane would be done by anybody. The writer regards the operation as insufficient in all cases, and never performs it. Hartwell²⁴ alludes to 3 recent cases in his experience in which the bowel had been cut off less than 1 inch beyond the growth in an effort to save the sphincters, and in which stricture or incontinence ensued.

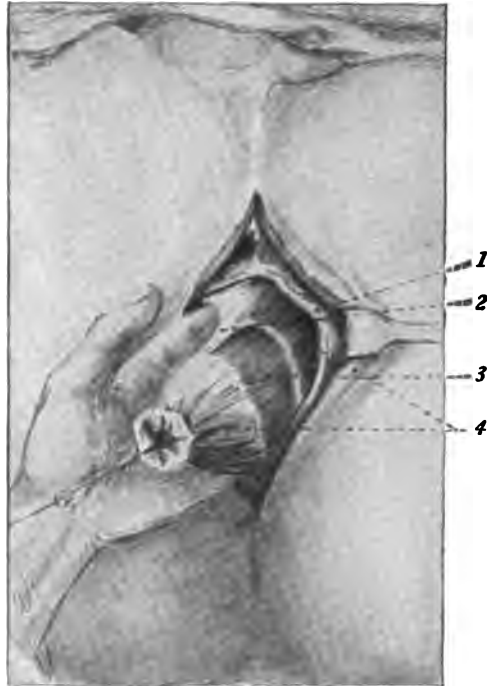


Fig. 205.—Perineal route. 1, external sphincter; 2, median raphe; 3, rectum; 4, levator ani. Quénu method. (After Tuttle.)

Cripps's method for extirpation of cancers low down in the rectum consists in introducing a long, sharp-pointed bistoury through the anus and bringing it out at the tip of the coccyx, cutting all the tissues, and laying open the rectum up to the coccyx. Lateral incisions are made around each side of the rectum, saving the anal skin if the anus is not involved by the growth, or removing it if involved. Hemorrhage is controlled by packing, and the rectum is freed, laterally and posteriorly, to a point well above the cancer. Anteriorly the rectum is freed from the urethra, prostate, and

²⁴ Jno. A. Hartwell: Trans. N. Y. Surg. Soc., 1912, vol. i, p. 197.

perineum. The gut is amputated above the growth, and allowed to heal by granulation. The fibrous canal, which finally forms, gives a satisfactory result if the bowels are kept from becoming too loose, as the sigmoid, which is the fecal reservoir, has not been disturbed.

Incontinence of feces should always be considered, and if the growth involves the sphincter this will follow; but a thorough removal of the malignancy is imperative, so that in cases low down in the rectum, which

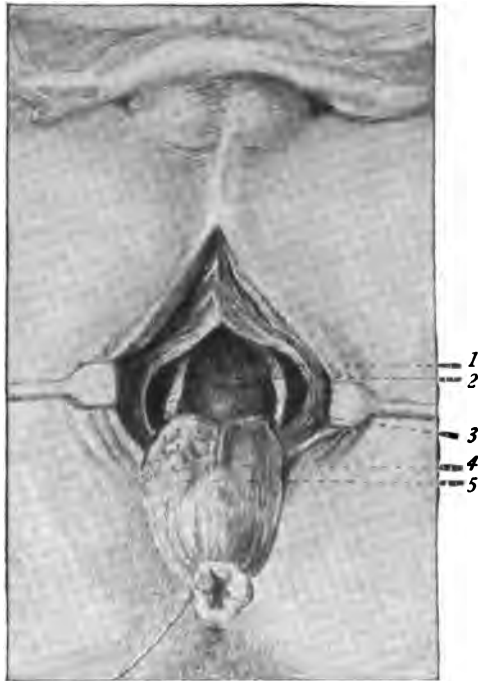


Fig. 206.—Perineal route. 1, levator ani; 2, seminal vesicles; 3, rectovesical pouch; 4, rectum; 5, growth. Quénu method. (After Tuttle.)

necessarily involve the sphincter, the question of a preliminary colostomy should be carefully considered, as it is better to do this first than at a later time, as healing will be quicker.

Vaginal Method.—The rectovaginal septum is so closely allied with the rectum that growths involving the gut may be readily felt, and especially if the septum itself is involved; resection of the rectum may be done through this structure. Murphy, of Chicago, has put the technique in clear form, as follows: The lithotomy position is used, with the hips elevated. The vagina is dilated with retractors, and the cervix drawn down. Douglas's *cul-de-sac* is opened with a transverse incision. The

intestines are packed off with pads, and the septum divided vertically from the first incision to the anal margin, including the sphincter. The vagina is separated from its rectal attachments, and the rectum and sigmoid drawn down. The gut is then cut transversely, 1 inch below the tumor, and vertically from this incision to the anus.

The proximal end of the gut is closed by forceps, and separated from its posterior attachment by scissors, as far up as the sacral promontory, so

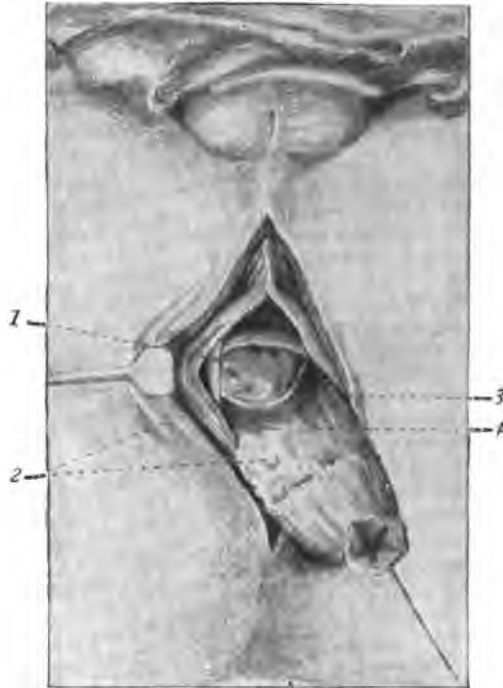


Fig. 207.—Perineal route. 1, levator ani; 2, growth; 3, peritoneal pouch; 4, rectum. Quénu method. (After Tuttle.)

that the bowel may be drawn down sufficiently to bring the healthy gut into the wound. The rectum is then amputated above the growth, and the upper and lower segments united by silkworm sutures passed from within outward. The anterior rectal wound is closed by the same method, and the ends of the sphincter united with catgut. The peritoneal incision is closed, and the vaginal septum brought together with silkworm sutures. A drainage-tube is placed in the rectum, extending above the site of anastomosis, and the vagina packed lightly with gauze. Tuttle has modified this by making a semicircular incision which extends into the retrorectal space between the anus and coccyx. This renders it possible to separate

the rectum from its posterior attachments and to postpone opening the bowel until after the peritoneal opening has been closed. The postanal wound also provides good drainage. He also uses 10-day chromicized gut for sutures, which does not require removal. The vaginal route for rectal excision is preferable in cases where the septum or the uterus is involved, but has no advantages over the perineal or sacral methods.

The *perineal* method of rectal excision has many advocates on account of its low mortality, but the method first used by Lisfranc in 1826 is not now followed. The method is open to the criticism that it is not as certain in the removal of involved ganglia, and unless preceded by a colostomy is liable to infection, especially if the external sphincter is retained. Mayo²⁵ states that in the obese or very anemic he uses, even in tumors of the lower sigmoid, the Quénu-Tuttle perineal resection of the entire rectum and lower sigmoid as high as the sacral promontory, with ease and safety. The technique of Quénu with the modifications of Tuttle, and called the Quénu-Tuttle method, is the one generally followed. After proper preliminary preparation the patient is anesthetized and placed in the lithotomy position, the hips elevated by sand pillows. The rectum is cleansed by enemata, dried, and packed loosely with gauze for identification. A circular perianal incision is made through the skin, and the parts are dissected up inside the sphincter for one-half inch. The loose skin is then tied with strong silk, the ends being left long to permit of use as a retractor (Fig. 204), and the anal skin is seared with the Paquelin cautery. The external sphincter is next divided both anteriorly and posteriorly, and the cut is continued to the tip of the coccyx. The rectum is separated from its lateral and posterior attachments, and the levator ani muscle is cut off closely to the bowel (Fig. 205).

The anterior skin incision is carried up to the scrotal junction, and the sphincter cut is deepened to correspond; the rectum is drawn downward and is freed from its anterior attachments as high as the levator ani muscle. The deep perineal fascia and the anterior part of the levator ani muscle are separated from the rectum by gently pulling downward and the anobulbar raphé is cut free from the bowel, thus freeing it.

The rectovesical pouch of peritoneum is freed from the rectum by blunt dissection, as the cellular tissue filling the superior pelvirectal space is readily loosened (Fig. 206).

The lateral folds of connective tissue are cut with scissors, and it will then be found that the rectum can easily be drawn out of the wound. If the growth extends up to the peritoneal investment and the peritoneum cannot be separated, the peritoneal cavity must be opened. If there is

²⁵ W. J. Mayo: *Op. cit.*, p. 247.

insufficient room posteriorly, the coccyx should be disarticulated and bent backward (when the sphincter muscle is involved in the growth, it is removed, and then there is no reason to save the coccyx for attachment, and in such cases the coccyx ought to be removed). The areolar tissue between the rectum and sacrum is loosened with the fingers, and the peritoneal pouch is pushed up or is opened (Fig. 207) and

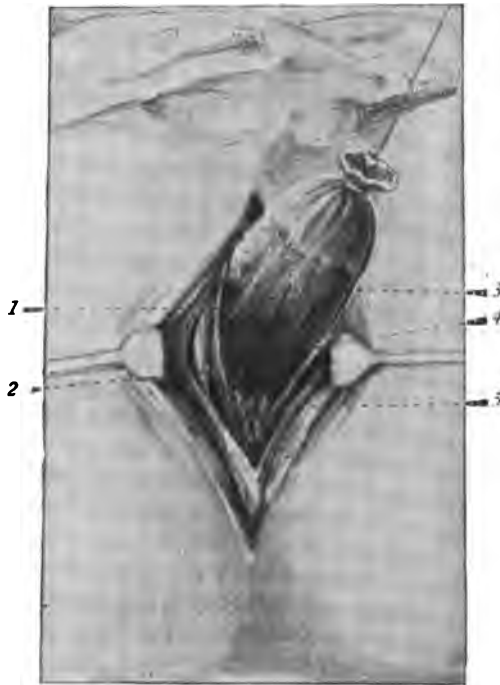


Fig. 208.—Perineal route. 1, peritoneal pouch; 2, levator ani; 3, rectum; 4, peritoneal pouch; 5, infected glands in folds of mesorectum. Quénu method. (After Tuttle.)

cut loose from the rectum close to that viscus. This incision is extended backward on both sides to the mesorectum, which should be severed close to the sacrum, so as to miss the superior hemorrhoidal artery (Fig. 208).

The rectum is now withdrawn from the wound sufficiently to make easy suturing to the anus. If this is satisfactory the peritoneum if cut is closed with fine catgut, and the pelvic floor restored.

The anus is next freed from the ligature and the gut is flushed with antiseptic solution; amputation of the rectum above the growth is then done, and the cut end is sutured at the anal site. The perineal wound is

packed with gauze for drainage and a drainage-tube inserted for discharges and gas.

The technique of Mayo²⁶ used in the cases of obese males is by an "incision from the anus along the left side of the sacrum, excising the coccyx. The anus is closed, and the rectum dissected out and the peritoneum opened in front, and the entire rectum, fat, and glands lifted from the seminal vesicles, prostate, and bladder. Lateral incisions are made in the peritoneum, and the rectum, tumor, and necessary sigmoid amputated. The proximal end of the sigmoid is carried down to and sutured into the muscles below. The distal end of the sigmoid is left closed, according to Peck, for four to seven days after operation. Primary union and fair muscular control were secured in four weeks. Proper preparation of the bowel before operation gives no trouble from the closed sigmoid stump, by using strained soups and albumin water. A small cannula passed through the stump and a rubber tube for gas relieves distress."

In one of the writer's cases in which preliminary colostomy was followed by the perineal operation, the sphincter was found to be involved, and was removed with the growth. As there was no chance for anal control, the upper end of the gut was brought out and stitched to the side of the base of the coccyx. Considerable mucus was discharged, but infection did not take place and the case made a very good recovery.

The Sacral Route.—In cases in which the growth is well above the sphincters, so that they may be preserved, the method of removing part of the sacrum devised by Kraske, in 1885, has come into general use.

The patient is placed in the right Sims position, and a median incision is made over the sacrum, extending down to the anus. The left side of the sacrum and coccyx are dissected free midway between the third and fourth sacral foramina. The sacrum is then cut away on the upper side, just below the third sacral foramen, down to the median line, and the coccyx is removed. The rectum is freed from its attachments both anteriorly and posteriorly. The peritoneum is stripped away from the rectum, or it is incised and packed off, and the gut is drawn down in the wound. The diseased part is then resected, and an anastomosis is made between the cut ends of the bowel. If a complete anastomosis cannot be made, then a sacral anus is formed. The peritoneal cavity is packed off with iodoform gauze and the perirectal spaces are tightly filled with gauze, to provide drainage and relieve tension. Many modifications of Kraske's sacral route have been tried, but the osteoplastic plan suggested by Rehn and Rydygier, and as modified by Tuttle, with some minor changes, is favored by many. This plan consists in making an incision on the right

²⁶ W. J. Mayo: *Op. cit.*, p. 247.

side of the sacrum from the posterosuperior spine of the ilium to the tip of the coccyx, and then to the anal margin. A transverse incision, at the level of the third sacral foramen, is made and the sacrum chiseled through. The flap thus formed is turned outward, and when the operation is completed is restored to place.

The steps of the *osteoplastic* sacral method consist in preparing the patient for operation, either with or without a preliminary colostomy, as may be indicated, and, after irrigating and packing the rectum, the left Sims position is used, with the hips elevated. An incision is made, as

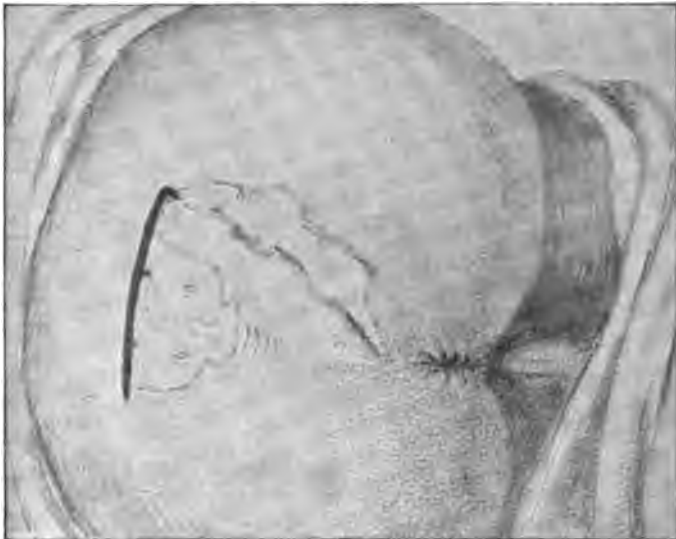


Fig. 209.—Removal of rectum by sacral route. Incision to form bone-flap. (Tuttle.)

shown in Fig. 209, and the tissue rapidly separated from the sacrum, and the bleeding vessels ligated. The bone is chiseled through, and turned back. The middle and right sacral arteries are ligated (Fig. 210) and the rectum is exposed. A careful examination is made to see if the growth can be brought down into the field, so that the cancer can be tied off both above and below without opening the peritoneum.

If it is necessary to open the peritoneal cavity, this is done and the rectum is drawn well out, so that the ureters, bladder, and seminal vesicles are not harmed.

When the incision of the lateral peritoneal folds (Fig. 211) is carried posteriorly to the mesorectum, the cut should be close to the sacrum, so as not to injure the superior hemorrhoidal artery and so as to render it

easier to ablate the mesorectal glands. When the bowel has been dissected free from its attachments it is brought down, so that it may reach the anal segment, and a strong tape or clamp is applied an inch above the growth. The peritoneal cavity is wiped dry and the pelvic floor restored by attaching the peritoneum to the rectal walls. The gut is then incised above the tumor, and the lower part, with the growth, dissected out from above downward, to the anus, except where the growth is within one inch of the anus, in which case the lower part is removed *en masse*. If more

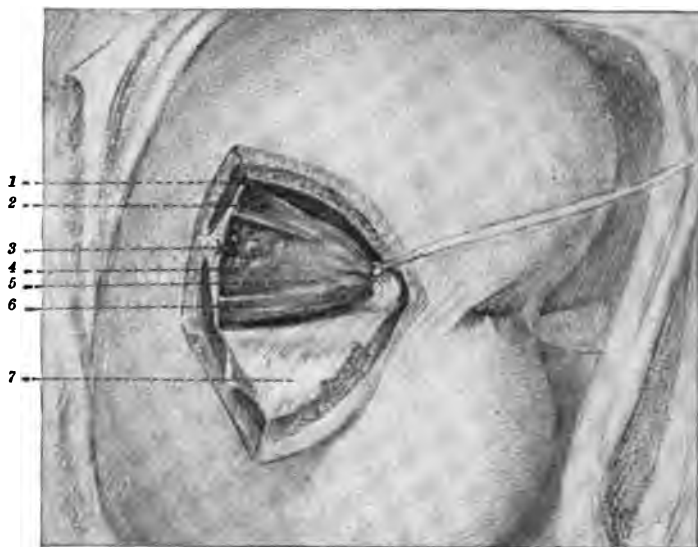


Fig. 210.—Removal of rectum by sacral route. Second step. 1, lateral sacral artery; 2, lateral rectal ligaments; 3, middle sacral artery; 4, neoplasm; 5, rectum; 6, lateral rectal ligament; 7, sacral bone-flap. (*Tuttle.*)

than an inch of healthy rectum remains, the cut segments may be united with a Murphy button, or by end-to-end suturing.

If there is less than an inch of healthy gut at the anus and the rectum cannot be brought down easily to the anal site, then a sacral anus will have to be made. If the rectum can be brought down easily to the anus, then the gut is brought through the denuded anus and stitched outside.

The sacral cavity is packed with gauze and the flap is sutured in place with silkworm gut. A drainage-tube is placed in the gut through the anus and the patient placed on the back. Considerable oozing will occur. The packing is left for three days and then removed.

Kraske has recently advocated dividing the rectum above the growth and then, through an abdominal incision, dissecting from above downward

to the lowest attachment. In completing this procedure the patient is brought from the Trendelenburg position to the right Sims posture and the operation completed by the sacral route. Fig. 212 shows the divided sigmoid, which has been inverted by a purse-string suture. The pelvic peritoneum is shown by the dotted lines. Fig. 213 shows the next step, where the mesorectum is ligated, and the rectum freed from its attachments. Fig. 214 shows the final step, or the rectum ready for removal through a posterior incision, which allows good drainage and is applicable when the anus and sphincters are to be left.

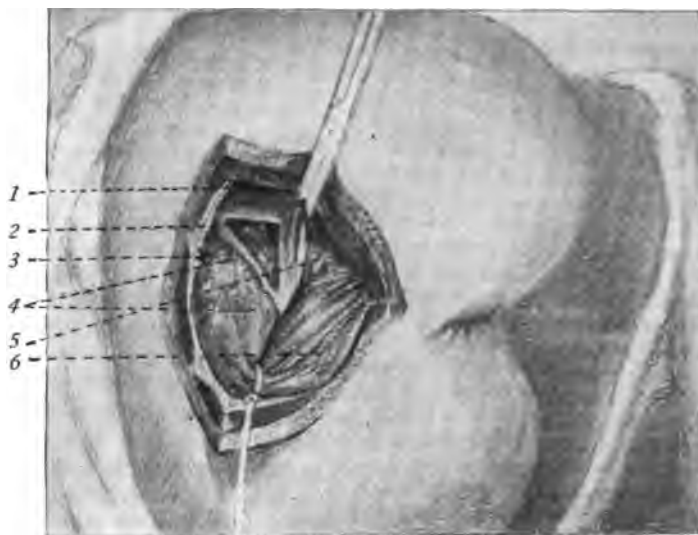


Fig. 211.—Removal of rectum by sacral route. Third step. 1, lateral sacral artery; 2, peritoneum; 3, middle sacral artery; 4, neoplasm; 5, seminal vesicle and bladder; 6, rectum. (Tuttle.)

Combined Method (Abdominoanal; Abdominoperineal; Abdomino-sacral).—In rectal cancer situated above the peritoneal investment the abdominal incision to determine the presence of metastasis is practised by many surgeons. If the liver is involved no radical operation should be attempted, but an inguinal anus should be established and the case be let alone. If, however, the case is found to be operable, the ease with which attachments of the rectum can be loosened from above has made the combination of the abdominal with one of the three other methods the one of choice. The abdominoanal method as modified by Weir consists in freeing the sigmoid and rectum down to the coccyx and prostate, tying two tapes below the growth, and incising the gut between them. The

upper segment, containing the growth, is then withdrawn through the abdominal wound, and the tumor removed. The lower segment is everted and the upper segment is drawn through it and sutured. The pelvic floor is restored and a postanal incision is made for drainage. The liability to

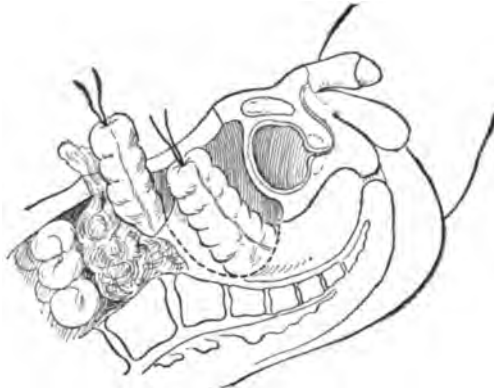


Fig. 212.—Combined abdominosacral method. (*Abbe*, in *Keen's Surgery*.)

gangrene because of ligation of the superior hemorrhoidal artery, and the resulting poor blood-supply to the lower segment, is one point of weakness in this method.

The abdominoperineal method resulted from a series of cases in



Fig. 213.—Second step in abdominosacral method. (*Abbe*.)

which operators found, when attacking the growth, that sufficient gut could not be brought down. They were compelled by force of circumstances to do a laparotomy, loosen the bowel from above, and then complete the excision from below, really a perineoabdominal method. This was followed by deliberately opening the abdomen, completing the dis-

section from above, and then reverting to the perineal removal. This necessitates two operations and leaves the patient with an artificial anus.

The technique of Martin²⁷ is used by a number of surgeons where the abdominal part of the operation precedes the perineal removal of the growth. "The cancer was located 4 inches above the sphincters. In the Trendelenburg position the abdomen is opened, the sigmoid is clamped at the lower part, crushed, tied, and cut with the cautery. The stumps are then invaginated and closed with purse-string sutures. The proximal end of the sigmoid is then brought out through an intermuscular incision on the left side, and the distal part of the sigmoid is freed down to the levator ani muscle. The patient is changed to the lithotomy position, and a purse-string suture is passed, encircling the anus. An incision is made to the

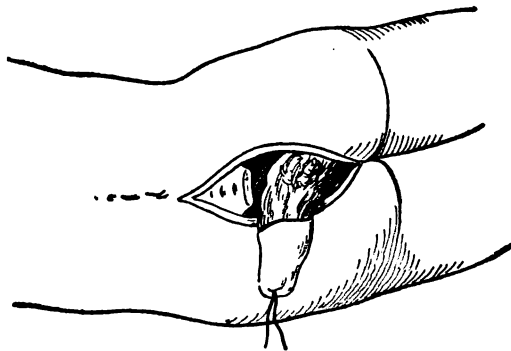


Fig. 214.—Third step in abdominosacral method. (Abbe.)

coccyx and the coccyx resected. The rectum and anus are freed from below, and the mass removed through the perineal wound. The perineal wound is then closed and drained. The patient is put in the dorsal position and the levator ani muscle and the peritoneum are sutured, and the abdominal wound is closed. This case was operated on in 1911, and is living and well."

The abdominosacral method is useful in cases where it is found by abdominal exploration that the growth is removable, that there is no metastasis, that enough gut can be brought down for anastomosis, and that it is easier to do this by the sacral route than from above, although by using the Murphy button it is a question if the abdominal is not the easier, as it undoubtedly is the quicker way. The great liability to the formation of a posterior fistula by using either the suture or Murphy button is also one of the drawbacks to this method. The great mortality from sepsis is another.

²⁷ Walton Martin: Trans. N. Y. Surg. Soc., vol. i, 1912, p. 196.

The technique of Hartmann²⁸ for the abdominoperineal extirpation of the rectum consists in opening the abdomen, and determining the operability, and, if inoperable, performing a colostomy. If a terminal perineal anus is to be made, *take the precaution to assure the vitality of the lower segment.* In order to bring the rectocolonic loop down to the perineum, it is necessary to cut the vascular pedicle formed by the superior hemorrhoidal artery, which has been followed in many cases by gangrene of the lower segment. This results from the fact that the anastomotic circulation along the colon ceases at the rectum, and the hemorrhoidal artery descends without it. The ligation of the superior hemorrhoidal artery cuts off the blood-supply of the parts below. To preserve the anastomotic circulation it is necessary to ligate a little below the promontory, through a small incision in the posterior peritoneum, thus preserving to the intestine its mesentery, which, as shown by Mondor, has a filiform anastomotic circulation independent of the arterial trunk. The mesentery, when it is cut, must not be cut too near the intestine for the same reason. The lateral peritoneal rectal folds and the Douglas *cul-de-sac* are incised, and the sacral cavity is emptied by following "the bone fairly close, just scratching along it, so to speak."

The left ureter must be avoided, and the sphincter is preserved or not as the case demands, although he prefers its removal, as it gives only relative continence, and may be the site of recurrence. Posterior drainage is established and the pelvic floor repaired. Hartmann is an advocate in selected cases of the anastomosis of the ileum with the colon, of simplifying the operation and making eradication more thorough, especially the ganglionic group corresponding to the left primitive iliac artery. In conclusion, he contends that the abdominoperineal route, in spite of its immediate gravity, seems the operation of the future on account of the lessened liability to recurrence.

Abbe²⁹ reports the excision by the following method of a large cancer of the rectum which involved the upper vaginal wall: "A left inguinal colostomy was performed; the distal end of the gut was closed and dropped back in the abdomen. In the lithotomy position an incision was made around the anus and through the perineum. The vaginal wall (which was involved by the growth), the rectum, and the sacral mass were removed through the perineal wound. The rectum was then cut off at the rectosigmoidal junction, above the cancer, and the open end of the sigmoid was left in the upper vagina. The perineal wound was closed in continuity with the anal incision. There was little or no mucus discharged into the

²⁸ Henri Hartmann: *Journal de chirurgie*, Dec., 1913, *op. cit.*

²⁹ Abbe: *Trans. N. Y. Surg. Soc.*, vol. i, 1912, p. 243.

vagina from the open end of the sigmoid. The patient is well ten years after the operation."

The statistics collected by Hartmann of cases operated on by the perineal or sacral route (Kraske) show 1665 cases, with 264 deaths (15.8 per cent.); 825 cases, with 561 recurrences (68 per cent.), or nearly 84 per cent. succumbed either at the operation or by recurrence of the disease. The recurrence is most often in the immediate neighborhood of the disease, and in the cellular tissue.

Compare these figures with the statistics of the combined operation by many operators, showing 260 cases, with 98 deaths (37 per cent.), which, with 18 per cent. of recurrence, shows 55 per cent. of mortality from operative shock or the course of the disease, compared with 84 per cent. as the result of the older methods.

The statistics of Hochenegg in 1902, quoted by Lusk³⁰: 1244 cases were collected which had been operated on by the posterior route (perineal and sacral), and, of these, 15.6 per cent. were well three years afterward. Hartwell³¹ has collected 50 cases in the practice of New York surgeons in which the sacral or perineal route was generally used, and there were 17 per cent. well after the three-year period.

It is possible that with improved technique the results may continue to show further reduction of mortality.

Choice of Methods.—Radical removal of a malignant growth of the rectum or sigmoid requires resection of gut, and also removal of associated glands. The problem of what to do with the divided ends of gut requires consideration. If the ends can be brought together without tension by any of the methods, whether abdominal or combined, then an end-to-end anastomosis is indicated, by suture or Murphy button. If the ends cannot be brought together, then the formation of a permanent inguinal colostomy is preferable to perineal or sacral anus. In such a case the lower segment is extirpated, or the cut end is invaginated and left in the pelvis to become atrophied.

A sacral anus after the plan of Hochenegg is not as satisfactory as an inguinal anus, because it is more difficult to keep clean. The left iliac anus through the rectus muscle, after the method of Lilienthal, has many features to recommend it.

The formation of a permanent colostomy, with removal of the entire rectum, pelvic glands, and cellular tissue, as done by Mayo, after Quénu, in either one or two stages, in selected cases, is a satisfactory method.

The fixation of the cut upper end of the gut, in the left inguinal area, whether by the intermuscular method of Witzel, the torsion method of

³⁰ Wm. C. Lusk: Trans. N. Y. Surg. Soc., *op. cit.*, p. 197.

³¹ Hartwell: Trans. N. Y. Surg. Soc., *op. cit.*, p. 197.

Gersuny, or by the separation of the fibers of the abdominal muscles, after McBurney, is discussed in the chapter on "Colotomy." One fact seems clear, that women stand the combined method better than men, and that the primary mortality of the perineal method is the smallest. It is a mooted question if it is not better in a man suffering from a growth, so low placed that the sphincters should be removed, to make an abdominal incision at the site for the colostomy, examine the abdominal viscera for extension of the growth, ascertain if the neoplasm should be or can be removed at all, and then make a permanent anus. After healing of this wound and the recuperation of the patient, the surgeon removes the entire lower segment of bowel, including the growth and associated glands, by the perineal method, invaginating the cut end or, if in haste, leaving it, as it becomes only a mucous fistula.

This is the method followed in the case illustrated by the frontispiece. The growth and healthy gut measured 5 inches in all, and the patient, who was in comparatively poor health and 62 years of age, was sitting up in a chair on the tenth day, and gained 25 pounds in three months. The camera-lucida drawing of the microscopic slide is here shown (Fig. 215).

The same plan is followed if the growth is as far up as the peritoneal investment; that is, removal of all the lower rectum and the sphincters. If the growth is located from the rectovesical pouch up to the promontory of the sacrum, then resection by the abdominal method, with end-to-end anastomosis, is practised, or if the ends cannot readily be brought together the surgeon resects, invaginates both ends, sutures them, and brings the proximal end outside the abdomen, and either removes the entire mass of the lower segment and the glands, or else leaves the rectum as a closed tube.

As women stand the combined method better than men, it is used oftener in women than in men.

The question will probably be decided by the antipathy of the patient or his physician to a permanent artificial anus, but it seems as if a definite amount of comfort must be sacrificed to obtain a thorough removal of the growth.

The principal arguments against all operations from the perineal aspect³² are: 1. Gangrene of the lower segment of the bowel, followed by prolonged suppuration and constriction, is liable to occur, due to the fact that the branches of the superior hemorrhoidal vessels are cut on the distal side of the junction of the anastomotic loop between the lowest sigmoid and the superior hemorrhoid arteries. Again, if there is any ten-

³² Choyce: System of Surgery, 1912, vol. ii, p. 722.

sion in suturing the gut to the anus, the sutures give and retraction of the bowel occurs followed by a stricture when healing is concluded. 2. If the bowel cannot be brought down to the anus, the operation has to be terminated by a perineal anus, and it can never be decided in advance of the operation when this will occur. An inguinal anus is better than a perineal anus. 3. The glandular lymphatic tracts are often imperfectly removed, and little, if any, of the mesentery of the pelvic colon is dissected out, increasing the liability of recurrence.

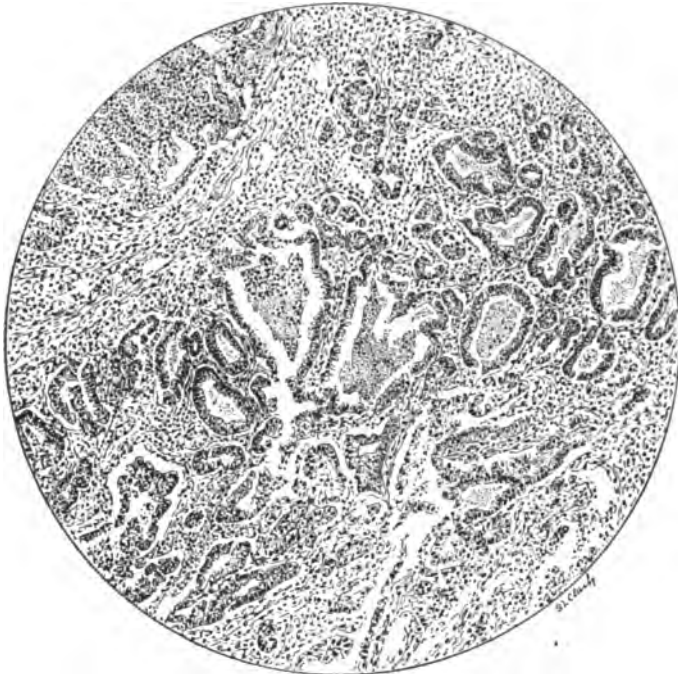


Fig. 215.—Microscopic examination of case of multiple polypi, with malignant (carcinomatous) degeneration. (Author's case.)

In comparing the relative advantages of the operation by the perineal or sacral route with the combined, or abdominoperineal, method, the *mortality* and the *end-results* should be carefully considered.

Mortality.—Radical operations for rectal cancer are severe, prolonged, and followed by much shock. Immediate mortality is considerable. If suppuration of the perineal wound follows the operation, it may lead to a fatal result in cases already debilitated. The Kraske operation shows somewhat greater mortality than the perineal method. The mortality is influenced by the condition of the patient and the amount of tissue re-

moved. There is general agreement among surgeons that the immediate mortality is greater from the combined operation than by any operation done through the perineum, and this must be considered in forming a decision as to the choice of methods.

End-results.—These vary somewhat as given by different writers, but there is a consensus of opinion that recurrence is more frequent after the perineal and sacral excision. Statistics are not yet great enough to show that recurrence is less frequent in the combined method. Theoretically, the combined method is superior to the perineal, but its higher mortality requires a very careful selection of cases. Those who are somewhat spare and not too old, who are free from marked atheroma of the arteries and are not subject to pulmonary disease, and with no other dyscrasia would be proper subjects for the combined method.

The combined method has additional advantages: the liver and abdominal viscera may be readily examined, and the patient may be saved from a severe operation, by the discovery of metastases; extension of the growth and glandular involvement may be estimated, and the possibility of its removal determined; the presence of secondary nodules on the peritoneum, which may occur without clinical symptoms; the mesentery of the pelvic colon may be examined, to see if it is long enough to allow the colon to be brought down to the anus, or, if not long enough, a preliminary colostomy may be done, and thereby obviate the formation of a perineal anus; that it is the best method by which the pelvic colon may be sufficiently freed and its blood-supply preserved in those cases in which it is desired to bring the bowel down to the anal margin; gangrene is less liable to follow, and convalescence shorter, with decreased probability of stricture; more thorough removal of diseased tissue, fat, and glands can be accomplished.

If the combined operation is decided on, there is still the subject of preserving the anus, and, while theoretically it seems as if the more extensive removal of the tissues is sufficient compensation for an artificial anus, yet the great aversion of patients to such an anus will in doubtful cases probably cause the selection of the method of bringing down the resected bowel to the anal margin.

RESECTION OF RECTUM AND RECTOSIGMOID, JAN. 1, 1910, TO APRIL 1, 1912.³³

Total number	71
Discharged	60
Died	11 (15.5 per cent.).

³³ W. J. Mayo: *Annals of Surg.*, Aug., 1912.

POSTERIOR AND PERINEAL OPERATIONS.

	Number of Cases.	Discharged.	Died.	Mortality, per cent.
Local operation	2	2	0	0
Harrison Cripps	5	5	0	0
Quénu-Tuttle	12	11	1	8½
Posterior (Kraske)	8	7	1	12.5
	<hr/> 27	<hr/> 25	<hr/> 2	<hr/> 7

ABDOMINAL OR ABDOMINAL COMBINED, IN ONE OR TWO STAGES.

	Number of Cases.	Discharged.	Died.	Mortality, per cent.
Abdominal and abdominoperineal, single stage	14	9	5	35
Preliminary colostomy with sec- ondary posterior operation in 2 stages	30	26	4	13
	<hr/> 44	<hr/> 35	<hr/> 9	<hr/> 20

Baldwin³⁴ describes a method by intussusception, in which through an abdominal incision the rectum with the growth and the sigmoid up as far as the longest portion of its loop was dissected free. The anus was dilated by an assistant, and a long pair of forceps passed up the bowel as far as the growth. A tape was tied round the bowel just below the opened end of the forceps. The bowel, including the growth, was pushed down by a hand in the pelvis while traction was used from below, until the gut was intussuscepted and protruded through the anus. Amputation was done and the ends sutured and returned. The patient retained good control. This method is useful in cases where the growth is small.

In conclusion: The mortality is high in all radical operations for removal of malignant rectal growths. The percentage of recurrence depends on the complete removal of the growth and associated glands. At least 2 inches of healthy bowel should be excised both above and below the growth. The average length of gut removed is about 5 inches except when the growth is low down.

If the growth is near the sphincters these muscles should be removed, on account of the added danger of recurrence if they are left. Removal of the sphincters requires the formation of a perineal anus. If the growth is below the sacral promontory, a resection of 4 inches or more of gut must be made. If the continuity of the rectum is restored, this requires ligation of the arterial supply of the lower segment, and such ligation is

³⁴ Aslett Baldwin: Brit. Med. Jour., July 18, 1908.

the cause of the high mortality from gangrene and sepsis. If the growth is in the sigmoid, resection will give good results, on account of the excellent blood-supply.

A sacral anus is a necessity in many cases in which the operation is the bone-flap, sacral, or Kraske method. An inguinal anus is preferable to either a sacral or perineal anus, on account of the facility with which it may be kept clean and comfortable. The formation of a preliminary inguinal anus is a safe operation, and allows of thorough abdominal examination. As it constitutes the first stage of the operation, it reduces mortality by dividing the shock. If a permanent colostomy has been decided on, the surgeon may pull up any redundant colon above the place for the new anus, so that a loop of colon may form above the opening. This loop, when full of feces, will convey that information to the patient, so that he may take proper measures for its evacuation.

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